Appendix B

Value Management Workshop report

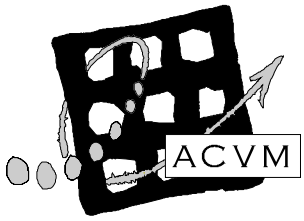
PACIFIC HIGHWAY UPGRADE

WOODBURN TO BALLINA

VALUE MANAGEMENT WORKSHOP

Workshop Report

July 2005



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Report

Background

The Pacific Highway is the main road transport corridor serving the north coast region of NSW and is a major highway link between Sydney and Brisbane. An agreement between the NSW and Commonwealth Governments to upgrade the Pacific Highway has led to an upgrade program to eliminate accident blackspots, provide dual carriageway conditions where possible, improve traffic flows and reduce travel times over a ten year period which ends in 2006.

The section of the highway (subject of this project) between Woodburn and Ballina is approximately 32km long and provides access to the townships of Woodburn, Broadwater and Wardell finishing at the southern end of the proposed Ballina Bypass project. The highway in this section is largely a single carriageway with one lane in each direction and limited overtaking opportunities. The highway is generally speed posted at 100km/h between townships and 60km/h within the townships.

It has intersections with various local roads serving coastal and rural residential communities.

The population growth on the Northern Rivers region in general is increasing which is likely to lead to further safety concerns on the road network.

Moreover, the through traffic volumes are expected to increase as the Pacific Highway Upgrade Program continues and the overall highway improves. These increases (in both local and through traffic volumes) is likely to lead to more traffic conflicts and increased congestion with the risk of increased accidents as well as reduced local amenity particularly caused by increased noise (a major issue in the community). The highway will continue to be used by the current mix of traffic (ie. heavy and light vehicles, etc)

Investigations to upgrade this section of the highway commenced in September 2004 with the Roads and Traffic Authority (RTA) commissioning Hyder Consulting Pty Ltd (the Hyder Study Team) to undertake route option investigation, concept development and an environmental impact assessment within the Study Area (see **Figure 1**). The preferred option is to meet the future transport needs for the highway whilst balancing social, environmental, heritage, functional, economic and cost factors.

For the purposes of identifying and assessing corridor options, the 32 km long Study Area has been divided into 3 Sections (see **Figure 1**):

- **Section 1**: 2.5km south of Woodburn to the middle of the existing highway through the Broadwater National Park between Woodburn and Broadwater
- **Section 2**: From Section 1 to just north of Coolgardie Road on the existing highway north of Wardell
- **Section 3**: From Section 2 to the southern end of the existing approved Ballina Bypass just north of Pimlico Road

Initially a long list of corridor options were developed by combining three different approaches referred to as traditional, community and quantum approaches. These options were assessed against performance criteria, measures and other interpretations. A review of strengths and weaknesses of the corridor options was also undertaken by the Study Team and through stakeholder consultation processes.

From this analysis, a short list of options was developed (see **Figure 1** and **Appendix 3** for description) for further detailed assessment and for public display and comment.

Now that the shortlist of corridor options has been developed and displayed for comment, a Value Management Workshop (VMW) was seen as the tool to bring together a wide range of stakeholder interests and expertise to review the investigations undertaken to date and on the balance of issues and assessment of the options against agreed assessment criteria, determine a preferred direction for further investigation to progress the project development.

The assessments of the value management workshop are seen as one input into the process for determining the preferred route for the project.

The Australian Centre for Value Management (ACVM) was commissioned to facilitate and report on the workshop which was attended by a range of stakeholders on **21st and 22nd July 2005**. A list of participants who attended the workshop can be found in **Appendix 1**.

Workshop Objectives

The objective of the workshop, as presented to the participants, was to:

- *Clarify how the shortlist of corridor options were determined*
- *Review the shortlist of options using the specialist assessments undertaken*
- *Canvass the issues and concerns of stakeholders*
- *Examine the corridor options developed and recommend a preferred direction, if appropriate to do so, to assist in progressing the project to the next stage of development*
- *Develop an action plan to progress the Study*

This report has been compiled by ACVM and seeks to provide an objective overview of the project aspects discussed and the outcomes formulated by the end of the workshop.

Workshop Activities

The workshop process builds on the perspectives as well as the detailed and specialist knowledge which resides with the workshop participants then structures the review and corridor option assessment from a functional base (ie. what must the project achieve to be successful and how well do the options perform against these).

During the workshop, background material was presented (**Appendices 2, 4, 5 and 6**). What was important about the project from various stakeholder perspectives was identified. The project objectives and the framework within which the project is being planned were reviewed.

Assessment criteria were developed under five key perspectives (Environment, Heritage, Functional, Social and Noise, and Business and Economics) based on what participants considered important for later assessment of the shortlisted corridor options (**Appendix 2**).

The shortlisted options (to meet the project objectives and address the problems identified) were reviewed by the group (**Appendix 3**) and a number of key issues and concerns were identified that still required to be addressed as the project proceeds.

The group then assessed the corridor options in each Section using the assessment criteria developed (**Appendix 3**).

The result of the assessment indicated that there was unanimous support for ***Option 1C in Section 1*** and ***Option 3B in Section 3*** as the preferred options to move forward for more detailed investigation and development to progress the project subject to satisfactory resolution of the issues raised during the workshop.

However, in ***Section 2*** of the Study Area, it was agreed that:

- *All the options examined have issues and risks*
- ***Options 2A and 2B** should not be further pursued*
- ***Option 2C** has possibilities subject to resolving the heritage issues, quarry issues, environmental issues, etc. However, **Options 2D, 2E and 2F** have also been assessed as possibilities subject to further investigation to resolve issues mentioned during the workshop*

The workshop discussions led the group to conclusions and actions as outlined below.

Workshop Outcomes

By the end of the workshop, the participants had:

- **Confirmed** the project objectives which reflect what the project must do to be successful in achieving its purpose. The project objectives are to:
  - Improve the efficiency of state, regional and local travel, safety and accessibility
  - Provide a flowing road alignment responsive to and integrated with the landscape, optimising views, elegant design and planting opportunities
  - Engage with the community and be informed of their views and experience
  - Identify and enhance potential beneficial environmental effects, and mitigate potential adverse environmental effects
  - Minimise adverse socio-economic effects on the local community and maximise socio-economic benefits arising from the project
  - Achieve high quality design and constructability
  - Achieve value for money
  - Apply a sustainable framework to all stages of the project
- **Reviewed** the givens and constraints that the Study Team were working within so there could be a common understanding of the framework in which the planning was taking place. These were agreed as:
  - The Woodburn to Ballina Project is part of the overall Pacific Highway Upgrade Program

- Townships are to be avoided (ie. bypass town centres)
- The maximum increase of flood level will be 50mm afflux as a result of the project and we need to be cognisant of duration, flows, velocity, etc
- Designing to 110km/hr design speed and to current RTA engineering design standards
- Targeting a 1:100 year flood immunity with a minimum of 1:20 year flood immunity for the road
- Appropriate recognition and protection of ecologically sensitive areas, prime farm land and other resources
- Appropriate recognition and protection of heritage and cultural sites (indigenous and non-indigenous)
- The Minister's announcement of the preferred route and concept design is expected by mid 2006
- Adherence to principles of ESD (as per the Route Option Development Report)
- Looking to achieve value for money

- **Identified** assessment criteria under five key perspectives (Environment, Heritage, Functional, Social and Noise, and Business and Economics) based on what participants considered important for later assessment of the shortlisted corridor options. The assessment criteria to assess the corridor options were agreed as:

Environmental

- *Impact on Key Habitats and Corridors*
- *Impact on Threatened Species and EECs*
- *Hydrological Impacts on Ecosystems*
- *Potential Water Quality Impacts*

Heritage

- *Threatened Significant Indigenous Heritage Sites*
- *Threatened Significant Non-Indigenous Heritage Sites*
- *Existence of Special Title, Ownership and Claims*

Functional

- *Travel Efficiency*
- *Safety*
- *Access Points/Links*
- *Aesthetics from the Highway*

Social and Noise

- *Relative Noise Increases*
- *Number of Noise Receivers*
- *Potential Flood Impacts*
- *Limits to Town Development*
- *Impacts on Rural Residential Development*
- *Aesthetics from the Community View*
- *Number of Residences lost in Route Footprint*

Business and Economic

- *Impact on Cane Production*
- *Loss of Regionally Significant Agricultural Land*
- *Road Proximity to Support Towns*
- *Other Business Impacts (eg. quarries, etc)*

- **Reviewed** the shortlisted corridor options tabled for the project, obtained an understanding of their relative merits and weaknesses and identified issues and concerns that still need to be addressed as planning proceeds (see **Appendix 3**).
- **Assessed** the shortlisted corridor options in each Section against the assessment criteria within each of the key perspectives and ranked the performance of each option. The options were also ranked in terms of the relative project cost estimates (see **Appendix 3**)
- **Agreed** that as a result of undertaking the assessment, that on balance:
  - In ***Section 1, Option 1C*** is recommended as the preferred option to move forward for more detailed investigation and development to progress the project because it performs better on all criteria other than from an environmental perspective. This recommendation was made subject to investigating the feasibility of avoiding or minimising impacts of removing vegetation, EECs and threatened species in the alignment
  - In ***Section 3, Option 3B*** is recommended as the preferred option to move forward for more detailed investigation and development to progress the project because it performs better on all criteria and is best value for money. This recommendation was made subject to confirming the road footprint for Option 3B and the impact on sugar cane land (if any)
  - In **Section 2** of the Study Area, there was agreement that:
    - All the options examined have issues and risks
    - **Options 2A & 2B** do not have many positives environmentally, functionally, business and economically and should not be further pursued
    - **Options 2D & 2E** are high risk options (traverse through indigenous Jali land, land claims, heritage issues, etc)
    - **Option 2C** is feasible subject to mitigation of environmental and heritage issues including ESD issues. However it is believed by some participants that it is not possible to achieve ESD on Option 2C due to immitigable impacts

        - **Option 2F** is feasible subject to being prepared to pay over 60% more than Option 2C and noting its ranking as the lowest performing option in section 2 from the functional, business and economic perspectives (it is believed by some participants that it is not feasible to fund Option 2F at such additional cost burden)
    - In summary, Option 2C has possibilities subject to resolving the heritage issues, quarry issues, environmental issues, etc. However, Options 2D, 2E and 2F have also been assessed as possibilities subject to further investigation to resolve issues

- **Developed** an outline of the process and direction (Action Plan) for the project to move forward from here (see next page).

Where to From Here?

At the conclusion of the workshop, an Action Plan was produced which outlined the direction and process to be undertaken by the Study Team and others to move the project forward from here.

No.	Task	By Whom	By When
1.	Deal with the issues and concerns tabled in light of the specialist presentations and information shared during the workshop	Shane Higgins/ Hyder Study Team	End July 2005
2.	Understand and resolve the quarry impacts and issues with regard to the preferred corridor options in Section 2	Shane Higgins/ Hyder Study Team	Concept Design Stage
3.	Establish an Aboriginal heritage focus group and finalise inputs for option consideration	Shane Higgins/ Mary-Lou Buck	End August 2005
4.	Secure a copy of the RTA Greenhouse Report for the Study Team and the CLG	David Corry	End July 2005
5.	Revisit/review other options should immitigable impacts arise on the shortlisted preferred options	Shane Higgins/ Hyder Study Team	Prior to Preferred Option Report
6.	Investigate source materials and the cost for the road construction	Shane Higgins/ Hyder Study Team	Concept Design Stage
7.	Clarify how the RTA has addressed greenhouse gas emission implications of the options	Shane Higgins/ Hyder Study Team	Prior to Preferred Option Report
8.	Determine how the alternative option (“flood free route” option) will be assessed relative to the shortlisted options	Shane Higgins/ Hyder Study Team	Prior to Preferred Option Report

Diagram indicating the Shortlisted Corridor Options

Figure 1: Corridor Options ***(diagram supplied by Hyder Consulting)***

Appendix 1. List of Participants

PACIFIC HIGHWAY UPGRADE: WOODBURN TO BALLINA
VALUE MANAGEMENT WORKSHOP

PARTICIPANTS LIST

Project Stakeholders

Paul Busmanis	Engineering Manager, Ballina Shire Council
Ian Gaskell	Environmental Scientist, Ballina Shire Council
Kim Forsyth	Project Co-ordinator, Department of Environment and Conservation
Scott Hunter	Department of Environment and Conservation
Greg Davey	Conservation Manager, Department of Primary Industries (Fisheries)
Rik Whitehead	Agricultural Environmental Officer, Department of Primary Industries
Jeff Brownlow	Mineral Resources (Armidale), Department of Primary Industries
David Thompson	Environmental Planning Officer, Department of Infrastructure, Planning and Natural Resources
Angela Owers	Secretary, Friends of the Koala
Natalie McCarthy	Natural Resource Manager, Strategic Planning, Lismore City Council
Charlie Mitchell	Lismore City Council
Hugh McMaster	Executive Officer, NSW Road Transport Association
Michael Wood	Project Co-ordinator, Richmond River County Council
Ray Medhurst	Manager Strategic Planning, Richmond Valley Council
Brian Eggins	Senior Strategic Planning Officer , Richmond Valley Council
John Hession	Strategic Planning Officer, Richmond Valley Council
Terry Gobbe	Distributions Asset Manager, Rous Water
Emma Walke	Community Liaison Group representative
Bert Plenkovich	Community Liaison Group representative
Mark Graham	Community Liaison Group representative
Jack Matthes	Community Liaison Group representative
Uncle Lewis Cook (Day 1 only)	Senior Custodian of the Njangabal/Aragwal Aboriginal Community
Artie Ferguson	Aboriginal Community
Lois Cook (Day 2 only)	Aboriginal Community

Roads and Traffic Authority

Bob Higgins	General Manager, Pacific Highway Office
Shane Higgins	Project Development Manager
David Corry	Senior Projects Manager, Road Network Infrastructure
Scott Lawrence	Environmental Advisor
Toby Heys	Project Officer
Mary-Lou Buck	Aboriginal Cultural and Heritage Consultant

PACIFIC HIGHWAY UPGRADE: WOODBURN TO BALLINA
VALUE MANAGEMENT WORKSHOP

PARTICIPANTS LIST (cont)

Hyder Consulting Study Team

Harry Batt	Project Manager
Andrew Nathan	Deputy Project Manager and Engineering
Carolyn Stone	Community Consultation
Annette Ross	Environmental Team Manager
Rob Peterson	Hydrology and Flooding Specialist
Matt Sugden	Noise Assessment Specialist
Mike Butler	Socio Economics Specialist
Mary-Anne McGirr	Urban and Landscape Design Specialist
Tanya Coates	Environmental Team Leader
Allen Macourt	Project Director
Graham Richardson	Project Control
Daniela Payne	Community Consultation
Peter Volk	Geotechnical Specialist
Brett Campbell	Ecology Specialist
Llewellyn Cain	GIS Systems Specialist

Workshop Facilitation Team

Ross Prestipino	Facilitator, ACVM
Alan Butler	Co-facilitator, ACVM

Appendix 2. Project Information and Analysis

Project Information and Analysis

The information presented in this Appendix is a consolidation of the general outputs and perceptions by the workshop group as they shared information about the Pacific Highway Upgrade: Woodburn to Ballina which allowed them to later make comparisons of corridor options based on the analysis of what the project was required to achieve.

Traditional Welcome

At the commencement of the workshop, a traditional welcome was made by Uncle Lewis Cook, Senior Custodian of the Njangabal/Aragwal People of the Bundjalung Nation. Key points made in his welcome were:

- Good morning ladies and gentlemen, my name is Lewis Cook. I am the senior custodian of the Njangabal/Aragwal People. I would firstly like to acknowledge the spirit of our ancestors who lived and protected our land with the knowledge of our lore and customs
- We, the Bundjalung Nation, take pride in our unique heritage. Today is significant to all of us because the proposed Pacific Highway Upgrade has brought us together with the wider community
- The Pacific Highway Upgrade proposal is an ambitious project and should be treated with respect and understanding. The CLG committee is to be congratulated for their fine effort working together with the consulting team to protect sites of significance as well as the flora and fauna of our homelands
- The traditional Aboriginal pathways linked our clans and the Bundjalung nation for centuries through cultural practices, ceremonies, festivals and family gatherings. You now call them roads
- Caring and sharing for our country and extending goodwill to the community is important to any committed group of people working together to achieve the best outcomes. The Bundjalung People want to protect our unique heritage and welcome those who want to be involved in this process
- Before European invasion, there was at least 70 Aboriginal languages and dialects spoken in NSW. Language is a direct linkage to land and country. It holds traditional songs and stories. It is about the deep and complex meaning of spirituality and reflects our unique cultural concepts and the way we look at the world. Although sites have been lost over time as a result of European settlement and natural environmental factors, our traditional homeland is still rich in existing Aboriginal sites which are of great cultural importance to our people
- In closing I would like to say thank you on behalf of our people for inviting me here today to welcome all of you

The Strategic Context of the Project

In order to allow the participants to obtain an understanding of the project's context, Bob Higgins, General Manager Pacific Highway Office, RTA and Shane Higgins, Project Development Manager, RTA outlined the strategic context of the project (the "Big Picture") within the context of the Pacific Highway Upgrade Program.

Key points raised in their presentation included:

- The purpose of the Pacific Highway is:
  - As a major transport asset of National significance
  - To provide safe and efficient transportation of people and goods to destinations between Sydney and Brisbane
  - To service coastal townships and populations along the route
  - To support National, Regional and Local economic development
- In terms of strategic considerations in meeting this purpose:
  - There is a need to secure a corridor for the future upgrade of the highway
  - Identification of a preferred route for the Woodburn to Ballina section of highway
  - Opportunities to stage construction
  - Planning for the project is being funded by the State Government as part of its $1.6 billion contribution to the 10 year upgrading program ($2.2 billion total)

  - What is the future (beyond the 10 year program)?
    - The State Government is committed to continue the upgrade of the Pacific Highway
    - Federal Government released AusLink White Paper which maintains $60 million/year to the end of current 10 year program (2006) and increases contributions to $160 million/year over the following 3 years
- Key drivers for the Program and the Project are:
  - Increasing pressure to accelerate the completion of dual carriageway due to:
    - Road safety (crashes including fatalities, separation of local and through traffic)
    - Increased travel demand from rapid population growth on the North Coast and anticipated increases in traffic volumes
  - Potential local community impacts such as:
    - Land use and future development
    - Local economy and business
    - Amenity – noise, visual, air quality, flooding and water quality
  - Potential environmental impacts (ie. flora and fauna, heritage)
  - Economic considerations (ie. constructability, cost and value for money)
- The Project has to strike a balance between transport needs, social needs and ecological needs while providing value for money
- Key constraints within the Study Area include:
  - Townships (ie. Woodburn, Broadwater/Rileys Hill, Wardell, Cabbage Tree Island/Lumleys Lane Communities)
  - Rural residential development
  - Major rivers and associated floodplains (Richmond River, Evans River and the Richmond Valley Floodplain)
  - Agricultural land use (ie. sugar industry)
  - Major topographical features (Blackwall Range, Cooks Hill, Langs Hill and Alleys Hill)
  - Environmental issues (including SEPP 14 Wetlands, National Park, Wardell Heath/high value vegetation and high value heritage areas)
- Development of the corridor options between Woodburn and Ballina included:
  - Project announcement in October 2004 with 3 Community Information Sessions (CISs) held in November 2004 at Wardell, Broadwater and Woodburn
  - A Planning Focus meeting and a Corridor Mapping Workshop were held with government agencies, local Councils and stakeholders in November 2004 and February 2005 respectively
  - In May 2005, corridor options were released for community information and comment
- For the purposes of identifying and assessing corridor options, the 32 km long Study Area has been divided into 3 Sections (see **Figure 1**):
  - **Section 1**: 2.5km south of Woodburn to the middle of the existing highway through the Broadwater National Park between Woodburn and Broadwater
  - **Section 2**: From Section 1 to just north of Coolgardie Road on the existing highway north of Wardell
  - **Section 3**: From Section 2 to the southern end of the existing approved Ballina Bypass just north of Pimlico Road
- The Pacific Highway Program objectives are:
  - ***Functional:***
    - Significantly reduce road accidents and injuries
    - Reduce travel times and freight transport costs
  - ***Social:***
    - Develop a route that involves the community and considers their interests
    - Provide a route that supports economic development
  - ***Environmental:***
    - Manage the upgrading of the route in accordance with Ecologically Sustainable Development (ESD) principles
  - ***Economic:***
    - Provide the best value for money

- Flowing from this, the Objectives for the Woodburn to Ballina Project are to:
  - Improve efficiency of state, regional and local travel, safety and accessibility
  - Provide a flowing road alignment responsive to and integrated with the landscape; optimising views, elegant design and planting opportunities
  - Engage with the community and be informed by their views and experience
  - Identify and enhance potential beneficial environmental effects, and mitigate potential adverse environmental effects
  - Minimise adverse socio-economic effects on the local community and maximise socio-economic benefits arising from the project
  - Achieve high quality design and constructability
  - Value for money
  - Apply a sustainability framework to all stages of the project
- The next steps in the process after the development of the shortlisted corridor options and their display to the community is the selection of a preferred route using the submissions made by the community, the technical assessments and the outputs of the value management workshop we are currently undertaking. Once the preferred corridor option is selected more detailed investigation will be undertaken to develop a concept design which then moves to the environmental assessment process before the project can be approved

Study Overview Presentation

An overview of the work undertaken to date and the steps ahead was presented by Harry Batt and Graham Richardson, Hyder Consulting Study Team. Key points made in their presentation which supplements the background information distributed to participants prior to the workshop included the following points below.

- A number of specialist investigations have been carried out across the Study Area and will continue in more detail as the project progresses and the preferred corridor is chosen. The investigation level to date has identified constraints to develop corridor options
- The constraints identified areas of topographic and geological features, areas that are sensitive from an ecological and/or heritage perspective, areas that have been identified as residential, industrial and commercial development sites, areas of high agricultural potential and areas of flood sensitivity
- The development of the corridor options takes these constraints into account in identifying potentially feasible corridors that meet the project objectives and avoids these areas where possible
- Initially a long list of corridor options were developed by combining three different approaches referred to as traditional, community and ‘Quantm’ approaches. These options were assessed against performance criteria, measures and interpretations. A review of strengths and weaknesses of the corridor options was also undertaken by the Study Team and through stakeholder consultation processes
- From this analysis, a short list of options was developed (see **Diagram 1**) for further detailed assessment and for public display and comment. Detailed specialist assessment of the corridor options will be presented later in the workshop
- The Value Management Workshop (VMW) which will be used to assess the corridor options will be used together with the specialist assessments and public comments to determine the preferred corridor option and lead us to undertake more detailed analysis in the next stage of the project

Community Liaison Group Perspectives

Four brief presentations were made by members of the Community Liaison Group (CLG) who represented the various community stakeholder perspectives within the Study Area. This gave the workshop participants a level of understanding of the issues important to various sections of the community at this early stage of the workshop. Key points made are highlighted below.

Emma Walke

- Emma stated she was a member of the local Aboriginal community who lived within the Study Area. She provided an opinion on the various options within each Section based on responses of those with whom she had discussed the options on public display.
- Emma's comments included:

  Section 1: People have not felt that any route option met with their approval

  Section 2: Corridor Options 2A, 2B, 2C and 2D should be disregarded since they created damage to important and fragile heathlands and traverse sections of "special" lands important to local Aboriginal communities – sacred, housing, titled lands, ceremonial lands, etc

  Section 3: There was a strong preference for Option 3B which generally followed the existing highway alignment

- Emma also underlined the importance to retain and protect the scarce remaining Aboriginal heritage areas and culturally significant sites because so much had already been lost and cannot be retrieved.

Jack Matthes

- Jack concentrated on his long history and experience with flooding in the Study Area. He acknowledged that Bert Plenkovich, a fellow CLG member who was delivering the next presentation, would focus on flooding in more detail. He would support Bert's comments.

- Jack made the following comments on corridor options in each Section:

  Section 1: There is flooding along all the corridor options except for the northern 3 kilometres

  Section 2: Corridor options 2A, 2B, 2C, 2D and 2E all flood in the southern area. Options 2A, 2B and 2C are all flood-free in the northern area. Option 2D appears to be affected by flood water in the north but this is felt to be an error on the mapping

  Section 3: These options do not have flood problems

Bert Plenkovich

- Bert spoke about two primary issues in this catchment being flooding generally and the Sugar Cane Industry.

Flooding:

- The catchment is larger than the project study area being 6,892km^2. It has only two drainage relief points – the Richmond River at Ballina and the Tuckombil Canal
- The system has a number of limiters to free flow which see flood waters back up, rise, hold and drain at a slower rate. These include "the hairpin bend" about 10km north of Woodburn and the weir on Tuckombil Canal. They create a bottleneck to flows. The new road could add to this problem and widen the effected areas and/or increase the flooding heights in the area
- Over 3,500 people are impacted by flooding and need support in flood times. Land inundation impacts are large and expensive – rotting vegetation, lost agistment, homes and possessions damaged and lost, etc.

  Section 1: Any barriers to the flow of flood waters on the east side of the river will have an impact

  Section 2: Options 2A and 2B impact on the bottleneck and at least 10 families of koalas. The management of the run of the river is a big issue throughout all options in this Section 2

  Section 3: Not as big a concern in terms of flooding

Sugar Cane Industry:

- The industry operates as a co-operative across the State. It generates over $200M per annum
- The industry feels it cannot lose any more useable land after 120ha was lost to the highway upgrade in the Tweed Valley. There are approx. 35,000ha of sugar cane lands in NSW and of this the Richmond Valley supplies approx.16,000ha
- Cane lands must be frost free and are prime agricultural lands
- There appears to be two competing government objectives being to: (i) protect scarce prime agricultural lands and (ii) create new bigger, safer, faster roads

- The worst corridor options from the perspective of the Sugar Cane Industry are Options 1A, 1B and 2F. It is estimated by the local sugar cane industry that when the new access roads, revised drainage layouts and the unsustainable severed sections of lands are excluded, approximately 1,000ha or an annual loss in production of 70,000 tonnes of sugar cane could result from an unfavourable corridor option choice. (*Note: these area figures were questioned and will need review and verification)*
- It should be remembered that this community has never had a flood free route.

As part of his presentation, Bert also presented an alternative option (called the "Flood Free" route option) to the shortlisted corridor options tabled for consideration in the workshop. His presentation material can be found in **Appendix 4**. Some initial investigation work was undertaken by Hyder Consulting and their preliminary findings on this alternative option (which they had called the CLG route) are also presented in **Appendix 4**. In terms of process, only the shortlisted options were to be assessed in the workshop and comparison of the preferred corridor option with this alternative option would take place outside the workshop.

Mark Graham

- Mark noted the special and in many ways unique areas which the Study Area covers from an ecological, threatened species and heritage perspective. He indicated that his research has identified 7 ecologically significant areas and over 100 threatened species, many nationally recorded on the endangered schedules which would be impacted or crossed by the shortlisted corridor options.
- Mark was overtly concerned with his beliefs that:
  - Many of these areas or threatened species posed "unmitigable" obstacles for certain corridor options which should be understood before the options could be assessed further
  - Inadequate consideration has been given to the significance of the wetlands and heath lands in the Study Area
  - No consideration has been given to the mapping of endangered ecological areas, for which there is an applicable Act of Parliament
  - The specialist ecological and environmental consultants have: not demonstrated scientific rigor; not incorporated data on additional critical aspects (eg. eight additional threatened species identified, etc) which have been provided to them by CLG members and Ballina Council; not surveyed over the necessary full seasonal periods; and that they have not been effectively comprehensive nor transparent in their output materials and findings
- Mark's comments on the corridor options specifically were concentrated in Section 2:
  - Options 2A and 2B impact on the Tuckean Broadwater (the No. 1 significant acid sulfate hotspot in NSW) which would certainly create massive water quality problems downstream and jeopardise important fishing resources
  - Options 2A, 2B, 2C and 2D all fragment wildlife corridors. The options also traverse culturally significant sites to the local Aboriginal community

What's Important about the Pacific Highway Upgrade: Woodburn to Ballina

The group identified from their various perspectives (individually, then within focus groups and finally collectively) what was important about the highway upgrade project. The group recorded what was important (shown below) and then reflected on the collated list (in five focus groups). Although acknowledging that all items are important, the group indicated which items were considered more critical by marking them with an asterisk (✱) as shown below. (More than one asterisk indicates an allocation by more than one focus group. Also some items were considered linked, as indicated, and only one of those items if considered more critical was asterisked).

No.	What's Important	Rating
1.	Maintaining the Northern Rivers "differentiators" (ie. heritage, culture, beauty and environmental diversity)	✱
2.	Reaching a balanced solution	
3.	Protecting and respecting indigenous culture, heritage, values and sites	✱✱✱✱
4.	Appropriately identifying and addressing noise impacts	✱
5.	Determining a route which meets the Pacific Highway Program objectives	

No.	What's Important (cont)	Rating
6.	Protecting and avoiding impact on wildlife corridors and key habitats *(linked to item 14)*	
7.	Forming an Aboriginal based focus group which is consulted and provided with information for the wider aboriginal community	
8.	Avoiding and/or minimising impacts on DEC estates	*
9.	Maintaining and enhancing flood plain management (holistic)	***
10.	Improving safety by providing best road standards for through and local traffic	**
11.	Demonstrating justification of the preferred corridor in terms of ecological, economic and social factors and that the process is transparent	
12.	Maintaining expansion potential for towns and minimising separation of communities	
13.	Minimising impact on agricultural land	***
14.	Avoiding threatened species, sensitive flood plain and EEC wetlands	***
15.	Minimising the level of compromise in environmental areas	
16.	Avoiding impacts and protecting water quality	
17.	Managing the impacts of increased traffic on the local road system	
18.	Creating a positive impact by reducing driving times, providing certainty of route for the community, etc	
19.	Not having a poor visual impact	
20.	Achieving an outcome that is best for most people	
21.	Providing safe driving conditions and reducing operating cost	
22.	Improving the safety of National Park estates (eg. for fire and wildlife management)	
23.	Meeting engineering standards for the road *(linked to item 10)*	
24.	Identifying and managing of air quality	
25.	Bypassing towns and minimising social and economic impacts	*
26.	Avoiding irreversible impacts (social, environmental and heritage impacts)	**
27.	Ensuring access to local communities is not compromised	*
28.	Reaching technical conclusions that are scientifically justified	*
29.	Minimising economic impact on the number of properties involved (including agricultural properties) *(linked to item 13)*	
30.	Repairing and restoring the urban/environmental quality of towns/villages	
31.	Protecting important identified resources (eg. quarries at Cooks Hill and Bagotville)	*
32.	Limiting fragmentation impacts by using or being close to the existing highway alignment (ie. Broadwater to Wardell)	
33.	Improving the noise environment	*
34.	Implementing suitable mitigation measures	
35.	Being financially viable	*
36.	Having no discernable adverse impacts to the sugar industry	
37.	Avoiding impacts on undeveloped native vegetation precincts and rural residential areas	
38.	Ensuring minimal loss of native vegetation	

Upon reflection, the workshop group concurred that there was overlap in the list. However, the list reflected the items considered important that the project needs to address as planning proceeds. This "What's Important" list (as well as other information such as the project objectives) would later be used in the workshop to develop clusters, and considerations within those clusters to assess the various corridor options in each Section of the Study Area.

Project Objectives

The group reviewed the project objectives (ie. what must the project achieve to be successful) as stated in the Route Options Development Report to ensure there was a common understanding as to what they were and clarification sought where required.

The Pacific Highway Upgrade: Woodburn to Ballina Project Objectives were agreed as to:

- Improve the efficiency of state, regional and local travel, safety and accessibility
- Provide a flowing road alignment responsive to and integrated with the landscape, optimising views, elegant design and planting opportunities
- Engage with the community and be informed of their views and experience
- Identify and enhance potential beneficial environmental effects, and mitigate potential adverse environmental effects
- Minimise adverse socio-economic effects on the local community and maximise socio-economic benefits arising from the project
- Achieve high quality design and constructability
- Value for money
- Apply a sustainable framework to all stages of the project

Givens and Constraints

The group discussed the givens and constraints that the Study Team were working within so there could be a common understanding of the framework in which the planning was taking place. These were added to where appropriate. The givens and constraints in which the project was being planned were agreed as:

- The Woodburn to Ballina Project is part of the overall Pacific Highway Upgrade Program
- Townships are to be avoided (ie. bypass town centres)
- The maximum increase of flood level will be 50mm afflux as a result of the project and we need to be cognisant of duration, flows, velocity, etc
- Designing to 110km/hr design speed and to current RTA engineering design standards
- Targeting a 1:100 year flood immunity with a minimum of 1:20 year flood immunity for the road
- Appropriate recognition and protection of ecologically sensitive areas, prime farm land and other resources
- Appropriate recognition and protection of heritage and cultural sites (indigenous and non indigenous)
- The Minister's announcement of the preferred route and concept design is expected by mid 2006
- Adherence to principles of ESD (as per the Route Option Development Report)
- Looking to achieve value for money

Developing the Assessment Criteria

As a result of the information shared in the workshop to date (in particular, the "What's Important" statements and the project objectives), a focus group consolidated a set of clusters and considerations within each cluster in order to assess the various corridor options in each Section of the Study Area.

The approach adopted was to have a focus group cluster the "What's Important" statements under five key perspectives being Environment, Heritage, Functional, Social and Noise, and Business and Economic.

Each "What's Important" Statement was categorised as falling under one of the clusters nominated (some statements were deemed multi faceted and were categorised under more than one cluster but with a different focus in each cluster) or as either duplicates, givens (*ie. use of RTA design and engineering standards, financially viable, etc*), outcomes (*ie. transparent and demonstrated justification, a balanced solution, meets Pacific Highway Program objectives, etc*), process focussed (*ie. establishing an aboriginal focus group, etc*) or not being able to assist in differentiating between corridor options.

Consolidated considerations within each cluster were then agreed based on the meaningfulness to differentiate between the corridor options.

Finally these were presented to the whole group for comment, amendment (as required) and finally endorsement to evaluate the various corridor options in each Section of the Study Area.

The assessment criteria identified under each of the five clusters accepted by the whole group to assess the corridor options were:

1. Environmental

A) Impact on Key Habitats and Corridors
B) Impact on Threatened Species and EECs
C) Hydrological Impacts on Ecosystems
D) Potential Water Quality Impacts

2. Heritage

A) Threatened Significant Indigenous Heritage Sites
B) Threatened Significant Non-Indigenous Heritage Sites
C) Existence of Special Title, Ownership and Claims

3. Functional

A) Travel Efficiency
B) Safety
C) Access Points/Links
D) Aesthetics from the Highway

4. Social and Noise

A) Relative Noise Increases
B) Number of Noise Receivers
C) Potential Flood Impacts
D) Limits to Town Development
E) Impacts on Rural Residential Development
F) Aesthetics from the Community View
G) Number of Residences lost in Route Footprint

5. Business and Economic

A) Impact on Cane Production
B) Loss of Regionally Significant Agricultural Land
C) Road Proximity to Support Towns
D) Other Business Impacts (eg. quarries, etc)

Having built a foundation and common understanding of the what's important to various stakeholders, the objectives (what the project is to achieve), and the considerations in clusters for assessment of the corridor options, the group was now in a position to broadly review the corridor options shortlisted for the project, outline their issues and concerns that still need to be addressed and assess the corridor options with the information available.

Appendix 3. Corridor Option Review and Recommendation

Corridor Option Review and Recommendation

Corridor Option Presentations

The Study Team led by Harry Batt, Project Manager, Hyder Consulting presented key investigations to the group of the shortlisted corridor options being considered. The shortlisted options are best described in the Route Options Development Report and appear in **Figure 1**. In short they consist of:

Section 1 – Southern Section

- **Option 1A** – Departs the existing highway approx. 3km south of Woodburn, generally running parallel and east of the existing highway. It crosses Tuckombil Canal and travels northeast (east of Woodburn). It then runs generally parallel to and east of the Richmond River between the existing highway and Lang Hill until it reaches McDonalds Creek where it then follows the existing highway again through the Broadwater National Park
- **Option 1B** – The same as Option 1A except it runs to the east of Lang Hill and then joins the existing highway north of McDonalds Creek
- **Option 1C** – Departs from the existing highway approx. 3 km south of Woodburn, crosses Tuckombil Canal and travels northeast (east of Woodburn). The route travels northeast around the eastern side of Lang Hill and then joins the existing highway just north of McDonalds Creek where it then follows the existing highway through the Broadwater National Park

Section 2 – Central Section

- **Option 2A** – Departs the existing highway at the northern end of the Broadwater National Park and heads northwest (generally parallel to the Richmond River) towards Rileys Hill. The route then curves to the north and bridges the Richmond River following an existing clearing west of Alleys Hill to the southern bank of the Tuckean Broadwater. It then bridges the Tuckean Broadwater to the northern bank west of the Ferry Wreck and then runs northeast and parallel to the Bagotville-Wardell Road. The route turns to the north near the Wardell communication tower. It then passes to the east of the toe of the Blackwall Range. Near the base of Buckombil Mountain, the route crosses Thurgates Lane and heads northeast avoiding the timbered land in the vicinity of Bingal Creek. The route heads east through the Wardell Heath towards the existing highway, then turns to the north west near Coolgardie Road
- **Option 2B** – Departs the existing highway at the northern end of the Broadwater National Park and heads north away from the highway and bridges the Richmond River west of Pelican Island. From the Tuckean Broadwater, the route generally heads north and joins Option 2A just east of the Wardell communication tower
- **Option 2C** – Departs the existing highway at the northern end of the Broadwater National Park and heads east running parallel to the Richmond River. At Broadwater, the route is east of the residential area and on the western side of Cooks Hill. After passing Cooks Hill, the route heads north and crosses the Richmond River west of Goat Island . The route then heads northwest and runs along the western edges of the Crown Reserve. It then follows the same line as Option 2A from Thurgates Lane
- **Option 2D** – Departs the existing highway at the northern end of the Broadwater National Park and heads east running parallel to the Richmond River. At Broadwater, the route is east of the residential area and on the western side of Cooks Hill. After passing Cooks Hill, the route heads north and crosses the Richmond River west of Goat Island . The route then heads northwest and runs along the eastern edges of the Crown Reserve. It continues north through Wardell Heath and circles Wardell to the west. It then follows a disused airstrip until it joins the existing highway until the Coolgardie Road intersection
- **Option 2E** – The same as Option 1D except at the northern end of the Broadwater National Park, the route turns east and skirts to the east of Cooks Hill. The route then turns northwest and joins Option 2D on the southern banks of the Richmond River
- **Option 2F** – Departs the existing highway at the northern end of the Broadwater National Park and heads east running parallel to the Richmond River. At Broadwater, the route is east of the residential area and on the western side of Cooks Hill. After passing Cooks Hill at Pine Tree Road, the route heads northeast parallel and east of the Richmond River. In the vicinity of Goat Island, the route then heads more northward towards Wardell. At Carney Lane the route turns northwest to cross the Richmond River south of Little Pimlico Island. The route turns northward and joins the existing highway near the northern end of the disused airstrip. From the northern edge of the disused airstrip the route follows the existing highway to the Coolgardie Road intersection

Section 3 – Northern Section

- **Option 3A** – Departs the existing highway north of Coolgardie Road and hugs the Blackwall Range escarpment and abutting sugar cane land. The route approaches then abuts the existing highway in the vicinity of Uralba and utilises the existing highway corridor until the Bruxner Highway interesction
- **Option 3B** – The route utilises the existing highway corridor from north of Coolgardie Road to the Bruxner Highway intersection

It should be noted that no further options were considered in the workshop. However, it was acknowledged that there was no "perfect" option and that whichever preferred options moved forward for further analysis in the next stage of development, there would be a level of fine tuning and improvement undertaken to ensure adverse impacts to those options were mitigated. Also it was acknowledged that other/alternative options put forward (ie. "Flood Free" Option) would need to be considered by the Study Team comparatively with the preferred option from the workshop.

Below is a list of the presentations of investigations of the corridor options in specialist areas made by the Study Team which summarised and supplemented information in the Route Options Development Report.

Key Presentations of the Corridor Options in Specialist Areas

- *Visual/Urban Design – Mary-Anne McGirr*
- *Engineering, Flooding and Geotechnical Investigations – Andrew Nathan, Rob Peterson, Peter Volk*
- *Environment (Ecology, Water Quality) – Annette Ross*
- *Heritage (Aboriginal, Non-Aboriginal) – Annette Ross*
- *Noise, Social and Economic Impacts – Matt Sugden, Carolyn Stone, Mike Butler*

The presentations can be found in **Appendix 5** except for the Social Impact presentation by Carolyn Stone. Some key points from her presentation are outlined below. Also it was acknowledged that there were some errors in environmental data presented by Annette Ross. This information has been amended in the material appearing in **Appendix 5**.

Social Impacts – *Carolyn Stone*

- There have been many specialist consultants working on the project and a number of areas overlap into the "Social Impacts" area. Consequently the scope of this presentation was adjusted to reflect dimensions other than these specialities.
- Main points of focus were:
  - Social character of the towns
  - Opportunity and accessibility to sporting and community support facilities
  - Amenity for the community (noise and visual aesthetics come together)
- The conclusions drawn indicated that there did not appear to be much differentiation between corridor options based on this social impact scope. However a number of issues common to all options would need to be addressed regardless of the option chosen as the preferred

Key Issues and Concerns to be Addressed

Having listened to the various specialist assessments of the corridor options, the group highlighted key issues and concerns that still required to be addressed as the project planning proceeded. The task was undertaken in five focus groups, each with a different topic. Their findings were presented to the whole group for comment, amendment, additions and finally concurrence that these issues be considered as the project is progressed.

The focus group findings together with amendments and additions as agreed by the whole group appear below.

Focus group 1: Environment

- Fragmentation of key habitats/corridors
- Scientific rigour underpinning findings

- Inclusion of all Threatened Species records
- Precise vegetation mapping (expanded outside corridors – old growth areas)
- Assessing quality of vegetation communities (habitats, structure)
- Clarification of potential impact on DEC reserves (ie. areas, locations, mitigation, compensation, etc)
- Identify species, habitats and EECs which are difficult to mitigate
- Clarification of impacts on aquatic habitats (ie. fisheries – commercial and recreational, threatened species, etc)
- Identification of funding projects and environmental initiatives (ie. CMA, Wetland Care Australia, Lismore Council, etc)
- Is Threatened Aquatic Species information available?
- Identify both major and minor creek crossings (Class 1, 2 & 3) for each corridor option
- Identify potential for impact on water quality and ensure protection on receiving environment
- Determine the feasibility of mitigation measures on water quality
- Assess the economics of loss of native vegetation/habitats
- Identification of local corridor and road kills (ie. information from Friends of the Koala)
- Correct identification of EECs
- Clarify detail and time period for the rezoning of Environmental Protection Land
- Identification of ecosystem services (ie. clean air, clean water, carbon dioxide sinks, etc)

Focus group 2: Heritage (Indigenous, Non-Indigenous)

Indigenous

- Clarification regarding Aboriginal Land Rights Act – appropriation
- Clarify Aboriginal lands under the Native Title Act or the Aboriginal Land Rights Act
- Further investigation required regarding potential sites around the chosen route
- Contact with knowledge holders for information
- Contact all Aboriginal stakeholder groups
- Establish an Aboriginal focus group
- Determine the social/emotional impacts on the community of the corridor options
- There is a risk of finding sensitive areas during the construction phase (eg. burial sites, Cooks Hill, Wardell cemetery)
- There is no mitigation for sacred sites

Non-Indigenous

- Once the preferred option has been chosen, determine the significance of cultural heritage on the route and avoid where possible or mitigate
- Check the legitimacy of the Meerschaum Vale brickworks
- Investigate the “Oakvale” homestead qualities/significance
- Clarify heritage items over 50 years old that might not be on a register but are significant
- Establish the status of the heritage value of items on the old Pacific Highway (that may be bypassed) especially bridge structures, drains, etc

Focus group 3: Engineering, Flooding and Geotechnical Investigations

- Acid sulfate soils issues – potentially understated sulphide bearing mineral deposits in basement rocks (could impact on water quality)
- Hydro-geology assessment required due to past mining disturbance – ground water management required
- Drainage/flood impact and its duration (check the current Flood Management regime)
- Assess any new drainage impacts (ie. acid sulphate soils or potential acid sulphate soils)
- Long term impact on the use of the local quarries (DA may be required)
- Impact on local roads during construction (ie. traffic management issues) (DA may be required)
- Water requirements during construction. Where will it be sourced (DA may be required)
- Source of road making materials (DA may be required, also a cost issue)
- Confirming bridge height requirements

- Noise impacts and changes to local traffic patterns
- Concern over the low number of geotechnical bore sites on Option 2F in reaching findings
- Air quality impacts and inversion layers need to be considered
- Sandplain aquifers need to be considered in planning

Focus group 4: Visual/Urban Design

- Views to and from the new highway need to be considered
- Noise mitigation measures can have negative visual impacts (mounds, noise walls, etc)
- If too close to urban areas then urban expansion can be restricted
- More difficult to mitigate visual impacts if the road goes through the middle of a landscape (easier if along boundary of say a vegetation boundary)
- The closer the road is to the river, the greater the visual impact (embankments) from the river (tourism, fishing, etc)
- Aesthetics of bridge design needs to be considered
- A balance between a variety of visual experiences for road users as against a monotonous landscape for the driver
- Gateway signage/welcome to the local aboriginal nation is important
- RTA can create character along the road
- Consideration of the existing visual impact is required
- Consistency of approach with other sections of the Highway Upgrade Program is required
- Further identification of rest points to view local features
- Consider the provision of heavy vehicle rest areas/ service centres/ using the towns as service towns

Focus group 5: Noise, Social and Economic Impacts

- The use of base data/existing impacts. Recognise that there are existing impacts
- Detailed consideration of flooding impacts – linked to economic impacts
- Even weighting for urban and rural amenity needs to occur
- Tourism and general impact upon businesses. There are threats and opportunities (SWOT analysis required)
- Detailed consideration of social and economic impacts need to be given at the stage of preferred option choice, specifically to rural farming businesses/and other land owners
- Specific acoustic mitigation measures (feasibility of certain measures). Could be an urban design issue
- Landform issues (particularly in relation to the amphitheatre effect) for corridor option noise assessment need to be considered. In particular western options of Section 2 impacted
- Concern over the level of detail with regard to noise sampling sites. In particular western options of Section 2
- The impacts to nature based tourism and the value of the Tuckean Broadwater, Wardell wetlands and heath lands
- Concern with the detail of ecosystem services (eg. clean water; clean air and carbon sequestration). Data is available from “Fish Unlimited Programme” (see Wetland Care Australia for further information)
- Fisheries and habitat considerations
- Logistics of cane haulage routes
- Social emotion of road location
- Due regard to the upcoming Parliamentary Enquiry on the Pacific Highway to the north and the learnings for this project

In summary, there were a number of key questions and reservations expressed which need to be resolved as planning proceeds. These included:

Questions:

- What ecological framework was used to strike out broader options to arrive at the short listed options?

- Can it be demonstrated how the data on threatened species and key ecological areas (provided by Ballina City Council and Mark Graham, CLG member) has been considered in the work of the Study Team in reaching the short listed options?
- If DEC considers the current environmental assessment on fisheries preliminary and not detailed, can we proceed with a preferred option without further data?
- Can the implications of the "Williams Case" be made clear to the Study Team in terms of "seeking to destroy" NPWS lands, Aboriginal titled lands, pending land claims and the provision of RTA's draft guideline for Aboriginal liaison?
- Can the reference to the existence of the Meerschaum Vale brickworks site be reviewed and removed from the documentation, if this is proven to be incorrect?
- Are noise mitigation measures feasible for light structures and where maintenance of the outdoor quality of life is a core desire?
- If "unmitigable" impacts become evident then will other options be revisited and reviewed?
- Is visual amenity from the community to be considered as by the current or future communities?
- What action is to be taken to do comparisons and assess benefits for the alternative corridor option (ie. "Flood Free" route")?

Reservations Expressed

- Completeness of data sufficient to be confident in the viability of the corridor options
- Level of scientific rigour to data presented by ecological sub-consultants
- Aboriginal habitation, heritage, cultural and ownership implications on the corridor options needs further investigation
- It is uncertain if some corridor options present an "unmitigable" impact on the environment or other feature to enable confidence in a preferred corridor, particularly in Section 2
- Uncertainty exists on the implications on the quarries and their businesses, their life, extraction methods, type of resource, etc
- Uncertainty of impacts to Eco-tourism businesses of the corridor options

The participants concurred that despite the questions and reservations expressed, there was sufficient collective knowledge at the workshop to proceed with the assessment of the route options. The challenge for the Study Team will be to further investigate and resolve these issues as the project planning proceeds.

Feedback Summary from the Corridor Options Display

Annette Ross, Environmental Team Leader, Hyder Consulting presented to the group a summary of findings from the written submissions and feedback forms received during the Corridor Options Display. Her presentation can be found in **Appendix 6**. However key points raised included:

- Issues raised (details in Appendix 6) could be categorised in the areas of:
  - Environment
  - Property
  - Traffic noise
  - Flooding and drainage
  - Lifestyle of local residents
  - Agricultural land
  - Air quality
  - Impacts on local business
- From the feedback forms,
  - 380 feedback forms were received. Respondents were requested to provide feedback on the importance of identified issues in Section 1, Section 2 and Section 3. Many respondents did not indicate a preference or provide feedback on the importance of particular issues
  - Respondents who indicated preferences favoured:
    - In Section 1 – Option 1C, followed by Options 1A & 1B on the basis of low level of impact on high value habitat areas, meets construction criteria, least impact on residential areas and high value agricultural land
    - In Section 2 – Options 2F & 2E and then Options 2B, 2D, 2A, 2C for environmental reasons such as habitat value as well as traffic noise and no resumption of private residences
    - In Section 3 – Option 3B because it makes use of the existing highway corridor, no encroachment into rural areas and less wildlife is affected

Assessment of Corridor Options

Having reviewed the shortlisted corridor options and discussed their advantages and disadvantages as well as issues to be addressed as planning proceeds in relation to the various specialist studies outlined in the presentations above (including information outlined in the Route Options Development Report), and supplemented with the knowledge and perspectives of the various workshop participants, the group was now in a position to assess the corridor options against the consideration and prompts under the five key perspectives developed earlier in the workshop.

The group (in five focus groups) assessed the corridor options in each Section using the considerations and prompts for each of the key perspectives being Environment, Heritage, Functional, Social and Noise, and Business and Economics. For instance, one focus group assessed the corridor options against the environmental considerations, whilst a second focus group assessed the corridor options against the heritage considerations, and so on.

The options were judged on a qualitative basis of how well each option met each consideration in each perspective on a scale of Excellent **(E)**, Very Good **(VG)**, Good **(G)**, Fair **(F)** or Poor **(P).**

Once the qualitative assessment was completed, the focus group reflected on the assessment and established “on balance” of the considerations made, a ranking for each corridor option in each Section within their allocated perspective or cluster.

During the process, each focus group recorded their observations and conclusions as a result of their deliberations and findings.

The findings of each focus group was presented to the whole group for discussion, amendment (if required) and finally endorsement as to an agreed assessment and ranking of corridor options within each perspective and Section to assist the group move forward.

Their findings as presented (together with amendments) and as agreed by the whole group are listed below. Their key observations in reaching their findings is also recorded.

Assessment of Corridor Options within the Environmental Perspective

Section 1	Environmental Perspective											
	Considerations **Prompts**		Impact on key habitats & corridors	Threatened species & EECs	Hydrological impacts on ecosystems	Potential water quality impacts						
OPTIONS												
1A			E (VG) G F P	E (VG) G F P	E (VG) G F P	E VG (G) F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	RANK **1**
1B			E VG (G) F P	E VG (G) F P	E VG (G) F P	E VG (G) F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	RANK **2**
1C			E VG G F (P)	E VG G F (P)	E VG G F (P)	E VG G F (P)	E VG G F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	RANK **3**

Section 2

	Environmental Perspective										
	Considerations **Prompts**		Impact on key habitats & corridors	Threatened species & EECs	Hydrological impacts on ecosystems	Potential water quality impacts					
OPTIONS											
2A			E	E	E	E	E	E	E	E	E
			VG	VG	VG	VG	VG	VG	VG	VG	VG
			G	G	G	G	G	G	G	G	G
			F	F	(F)	F	F	F	F	F	F
			(P)	(P)	P	(P)	P	P	P	P	P
											RANK **4**
2B			E	E	E	E	E	E	E	E	E
			VG	VG	VG	VG	VG	VG	VG	VG	VG
			G	G	G	G	G	G	G	G	G
			F	F	(F)	F	F	F	F	F	F
			(P)	(P)	P	(P)	P	P	P	P	P
											RANK **4**
2C			E	E	E	E	E	E	E	E	E
			VG	VG	VG	VG	VG	VG	VG	VG	VG
			G	G	(G)	(G)	G	G	G	G	G
			(F)	F	F	F	F	F	F	F	F
			P	(P)	P	P	P	P	P	P	P
											RANK **2**
2D			E	E	E	E	E	E	E	E	E
			VG	VG	VG	VG	VG	VG	VG	VG	VG
			G	G	G	G	G	G	G	G	G
			(F)	(F)	F	(F)	F	F	F	F	F
			P	P	(P)	P	P	P	P	P	P
											RANK **3**
2E			E	E	E	E	E	E	E	E	E
			VG	VG	VG	VG	VG	VG	VG	VG	VG
			G	G	G	G	G	G	G	G	G
			(F)	(F)	F	(F)	F	F	F	F	F
			P	P	(P)	P	P	P	P	P	P
											RANK **3**
2F			(E)	(E)	(E)	E	E	E	E	E	E
			(VG)	VG	VG	(VG)	VG	VG	VG	VG	VG
			G	G	G	G	G	G	G	G	G
			F	F	F	F	F	F	F	F	F
			P	P	P	P	P	P	P	P	P
											RANK **1**

Section 3	Environmental Perspective										
	Considerations Prompts		Impact on key habitats & corridors	Threatened species & EECs	Hydrological impacts on ecosystems	Potential water quality impacts					
OPTIONS											
3A			E	E	E	E	E	E	E	E	E
			VG	VG	VG	VG	VG	VG	VG	VG	VG
			G	G	G	G	G	G	G	G	G
			F	F	F	F	F	F	F	F	F
			P	P	P	P	P	P	P	P	P
3B			E	E	E	E	E	E	E	E	E
			VG	VG	VG	VG	VG	VG	VG	VG	VG
			G	G	G	G	G	G	G	G	G
			F	F	F	F	F	F	F	F	F
			P	P	P	P	P	P	P	P	P

RANK 2

RANK 1

Key Observations

The group noted that as some updated ecological data had only been presented at the workshop, and that the Ecology report was still being finalised, it had to accept the updated information at face value when undertaking the assessments. The group raised concern that this may have resulted in some incorrect ranking of options (specifically in relation to section 2), although the collective knowledge of the group also assisted in the ranking of the options.

Section 1

- For the consideration of "Impact of key habitats and corridors":
  - The focus group made the assumption that all likely/known threatened flora species and vegetation communities have been identified within the Study Area
  - The focus group made the assumption that the threatened species have been appropriately linked to the habitat type
  - The corridors identified do not necessarily include the smaller corridors
  - The EEC table in the Report is an overestimate except for freshwater wetland EECs
  - The amount of hectares of vegetation identified and impacted is questioned. Relative total vegetation of each corridor has been used as a reference point
- For the consideration of "Threatened Species and EECs", the real differentiating factor is measured by the section between Woodburn and the start of the National Park
- For the consideration of "Hydrology impacts on ecosystems":
  - The focus group made the assumption that the inundation times are short enough that it does not impact upon the environment (Will there be changes to current trends?)
  - De-oxygenation of water is a major factor
- For "Potential water quality impacts", findings indicate that Option 1A and 1B are equal and that Option 1C is less preferred

Section 2

- For the consideration of "Impact of key habitats and corridors", The focus group made the assumption that fauna usage is the same across all corridors that are crossed. The group could not differentiate between Options 2A, 2B, 2C, 2D or 2E initially as to which was relatively worse, although Option 2F was unanimously assumed the best option.
- For the consideration of "Threatened Species and EECs":
  - Need to check the amount of vegetation removed in Options 2E & 2D in the area where the two corridors differentiate

  - Option 2E is assumed to link to Option 2D only (not to Option 2C or other options), thereby Option 2E was not possible to separate from Option 2D
  - Options 2A, 2B & 2C were acknowledged as being worse than the other options. The decision of these relative to each other was more difficult to make. They were decided as being equally as bad as each other because of the impact on a very important salt marsh (which is a very rare EEC in Option 2B) – even though the total area of EECs was less than in Option 2A & 2C
  - The assessment could be done at a finer level if the assessment of threatened species and EECs were separated
  - The two other species (with difficulty in mitigation) are the Wallum Sedge Frog and the Wallum Froglet – which are identified for being potentially being resident in Option 2D
  - Freshwater wetland EECs are also not mapped in Option 2D (this needs to be investigated, as this information is only an opinion)
  - The occurrence of Blossom Bats; Squirrel Gliders and known Koala habitats in the Lumleys Lane area of Option 2C, has to be considered in terms of possible mitigation measures
- For the consideration of "Hydrology impacts on ecosystems":
  - Inundation was not considered as big a problem as the interruption of Coffee Rock, aquifers and water table interruptions is not large although the exact impacts needs to be quantified
  - There were difficulties in differentiating between Options 2A, 2B & 2C
  - Defining hydrological impact is very difficult to ascertain at this stage due to lack of data for Option 2A, 2B & 2C
- For "Potential water quality impacts", all corridor options have a major effect at the tail route stage of water flow impacts

Section 3

- For the consideration of "Impact of key habitats and corridors", the fragmentation issue already exists in Option 3B (existing road) therefore it is the better option
- For the consideration of "Threatened Species and EECs", existing impacts are already there in Option 3B therefore it is the better option
- For "Potential water quality impacts", there are many creek and drain line crossings in Option 3A. For Option 3B, flood mitigation is already in place therefore Option 3B is rated good

Assessment of Corridor Options within the Heritage Perspective

Section 1

	Heritage Perspective											
	Considerations Prompts		Threatened significant indigenous heritage sites	Threatened significant non-indigenous heritage sites	Existence of special title, ownership, claims							
OPTIONS												
1A			E	E	E	E	E	E	E	E	E	RANK
			VG	VG	VG	VG	VG	VG	VG	VG	VG	
			G	(G)	G	G	G	G	G	G	G	**3**
			F	F	(F)	F	F	F	F	F	F	
			(P)	P	P	P	P	P	P	P	P	
1B			E	E	E	E	E	E	E	E	E	RANK
			VG	VG	VG	VG	VG	VG	VG	VG	VG	
			G	(G)	G	G	G	G	G	G	G	**2**
			F	F	(F)	F	F	F	F	F	F	
			(P)	P	P	P	P	P	P	P	P	
1C			E	E	E	E	E	E	E	E	E	RANK
			(VG)	(VG)	VG	VG	VG	VG	VG	VG	VG	
			G	G	(G)	G	G	G	G	G	G	**1**
			F	F	F	F	F	F	F	F	F	
			P	P	P	P	P	P	P	P	P	

Section 2

	Heritage Perspective										
	Considerations / **Prompts**		Threatened significant indigenous heritage sites	Threatened significant non-indigenous heritage sites	Existence of special title, ownership, claims						
OPTIONS											
2A			E VG **(G)** F P	E VG G **(F)** P	E VG **(G)** F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	RANK **1**
2B			E VG G **(F)** P	E VG G **(F)** P	E VG **(G)** F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	RANK **3**
2C			E VG G F **(P)**	E VG G F **(P)**	E VG G **(F)** P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	RANK **4**
2D			E VG G F **(P)**	E VG G F **(P)**	E VG G F **(P)**	E VG G F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	RANK **5**
2E			E VG G F **(P)**	E VG G F **(P)**	E VG G F **(P)**	E VG G F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	RANK **6**
2F			E VG **(G)** **(F)** P	E VG G **(F)** P	E VG **(G)** F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	RANK **2**

Section 3

Section 3	Heritage Perspective										
	Considerations Prompts		Threatened significant indigenous heritage sites	Threatened significant non-indigenous heritage sites	Existence of special title, ownership, claims						
OPTIONS											
3A			E	E	E	E	E	E	E	E	E
			VG	VG	VG	VG	VG	VG	VG	VG	VG
			G	G	G	G	G	G	G	G	G
			F	F	F	F	F	F	F	F	F
			P	P	P	P	P	P	P	P	P
3B			E	E	E	E	E	E	E	E	E
			VG	VG	VG	VG	VG	VG	VG	VG	VG
			G	G	G	G	G	G	G	G	G
			F	F	F	F	F	F	F	F	F
			P	P	P	P	P	P	P	P	P

	RANK
3A	2
3B	1

Key Observations

Section 1

- For the consideration of "Threatened significant indigenous heritage sites":
  - Option 1C has less impact on the massacre site at Woodburn
  - Options 1A or 1B would require 150m buffer to the massacre site
  - No differentiator on this consideration for traversing in front or behind Lang Hill
- For the consideration of "Threatened significant non-indigenous heritage sites":
  - Some non-indigenous heritage items occur in Woodburn
  - Option 1C is further away, therefore better (but not a key differentiator)
  - Option 1B preserves more of the existing Pacific Highway than Option 1A
- For the consideration of "Existence of special title, ownership or claims":
  - Evans Creek has Aboriginal significance, hence Option 1C slightly better than Options 1A & 1B
  - Need to review areas of Crown Land under Native Title Claim. Potential impact on Option 1C

Section 2

- For the consideration of "Threatened significant indigenous heritage sites":
  - Scarred trees near Wardell Road - Impact on Options 2A, 2B, 2C
  - For Option 2A, no issues until Wardell Road (good past Rileys Hill/Tuckean Broadwater)
  - For Option 2B near Bagotville Post Office, there is potential indigenous heritage impacts
  - Sacred site at the crossing of the Richmond River near Options 2C, 2D, 2E
  - Scar trees on Option 2C, north of the Richmond River
  - Potential burials/camp/artefacts south-west of Wardell (Impact by Option 2D) – camp site may extend further south
  - Bora ring to the west of Option 2D near Cabbage Tree Island
  - Scarred trees are some of the last remnants of Aboriginal heritage in the area
  - Options 2A to 2D all affect areas with remaining tangible evidence of Aboriginal heritage
  - Wardell cemetery and Bingal Creek areas are highly significant (Impact by Option 2D)
  - For Option 2E, there is significant impact past Cooks Hill (this could be improved by moving the corridor east)
  - For Option 2E, there is potential "men's business" at Cooks Hill
  - For Option 2F, there is potential "women's business" north and east of Cooks Hill

- There are potential burials between Broadwater and Cooks Hill to Boundary Creek (Impact by Options 2C, 2E, 2F)
- For Option 2F, traditional access from Cabbage Tree Island to Boundary Creek and the ocean would need to be maintained. There is a traditional camp at Boundary Creek (Impact by 2F)
- More investigation and ground survey will be required on Option 2F if it is the preferred option

- For the consideration of "Threatened significant non-indigenous heritage sites":
  - Review the status of "Oakvale" Homestead (Impact by Options 2A, 2B, 2C)
  - Review the status (and possibly the existence)of Meerschaum Vale Brickworks (Impact by Options 2A, 2B, 2C)
  - Option 2A – Fair but impacts on Stonehenge? *(questionable)*
  - Option 2B – Fair but impacts on Bagotville Post Office and Stonehenge
  - Option 2C – Poor (additional impact on Byrne property)
  - Option 2D – Poor (impacts on Byrne property as well as Wardell cemetery and Bingal Creek
  - Option 2E – Poor (impacts on Wardell cemetery and Bingal Creek)
  - Option 2F – Fair
- For the consideration of "Existence of special title, ownership or claims":
  - Options 2A & 2B – Good (no known impacts)
  - Option 2C – Fair (impacts on edges of Local Aboriginal Land Council – LALC land)
  - Options 2D & 2E – Poor (major impact on LALC land)
  - Option 2F – Good (no known impacts)

Section 3

- For the consideration of "Threatened significant indigenous heritage sites", there is potential for some artefacts in the foothills of Blackwall Range
- For the consideration of "Threatened significant non-indigenous heritage sites", there are no significant issues
- For the consideration of "Existence of special title, ownership or claims", there are no significant issues

Assessment of Corridor Options within the Functional Perspective

Section 1	Functional Perspective										
	Considerations Prompts		Travel efficiency	Safety	Access points/links	Aesthetics from highway					
OPTIONS											
1A			E	E	(E)	(E)	E	E	E	E	E
			(VG)	VG	VG	VG	VG	VG	VG	VG	VG
			G	G	G	G	G	G	G	G	G
			F	(F)	F	F	F	F	F	F	F
			P	P	P	P	P	P	P	P	P
											RANK 3
1B			E	E	(E)	(E)	E	E	E	E	E
			VG	VG	VG	VG	VG	VG	VG	VG	VG
			(G)	(G)	G	G	G	G	G	G	G
			F	F	F	F	F	F	F	F	F
			P	P	P	P	P	P	P	P	P
											RANK 2
1C			(E)	(E)	E	E	E	E	E	E	E
			VG	VG	(VG)	(VG)	VG	VG	VG	VG	VG
			G	G	G	G	G	G	G	G	G
			F	F	F	F	F	F	F	F	F
			P	P	P	P	P	P	P	P	P
											RANK 1

Section 2

	Functional Perspective										
	Considerations **Prompts**		Travel efficiency	Safety	Access points/links - local	Access points/links - highway	Aesthetics from highway				
OPTIONS											
2A			E VG G **F** P	E **VG** G F P	E VG **G** F P	E VG G **F** P	E VG **G** F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P
											RANK **5**
2B			E **VG** G F P	E VG **G** F P	E VG G **F** P	E VG G **F** P	E VG **G** F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P
											RANK **4**
2C			E VG G F **P**	E **VG** G F P	E **VG** G F P	**E** VG G F P	E VG G **F** P	E VG G F P	E VG G F P	E VG G F P	E VG G F P
											RANK **3**
2D			**E** VG G F P	E **VG** G F P	E VG **G** F P	**E** VG G F P	E VG G **F** P	E VG G F P	E VG G F P	E VG G F P	E VG G F P
											RANK **2**
2E			E **VG** G F P	E **VG** G F P	**E** VG G F P	**E** VG G F P	E VG G **F** P	E VG G F P	E VG G F P	E VG G F P	E VG G F P
											RANK **1**
2F			E VG **G** F P	E VG G F **P**	E VG G F **P**	E VG **G** F P	E VG **G** F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P
											RANK **6**

Section 3	Functional Perspective										
	Considerations Prompts		Travel efficiency	Safety	Access points/links	Aesthetics from highway					
OPTIONS											
3A			E	E	E	E	E	E	E	E	E
			VG	VG	VG	VG	VG	VG	VG	VG	VG
			G	G	G	G	G	G	G	G	G
			F	F	F	F	F	F	F	F	F
			P	P	P	P	P	P	P	P	P
3B			E	E	E	E	E	E	E	E	E
			VG	VG	VG	VG	VG	VG	VG	VG	VG
			G	G	G	G	G	G	G	G	G
			F	F	F	F	F	F	F	F	F
			P	P	P	P	P	P	P	P	P

RANK 2

RANK 1

Key Observations

Section 1

- For the consideration of "Travel efficiency", all routes have similar lengths, with Option 1C slightly shorter. Therefore, similar travel efficiency (Option 1C best, followed by Option 1A, then Option 1B)
- For the consideration of "Safety", Option 1C has the shortest length of safety barriers, Option 1A the greatest length. Therefore, Option 1C best, followed by Option 1B, then Option 1A (worst)
- For the consideration of "Access points and links", Options 1A and 1B are closer to Woodburn and, therefore, with similar access issues, with Option 1C further away. Therefore, Options 1A and 1B are the same, then Option 1C (worst)
- For the consideration of "Aesthetics from the highway", Option 1A has views of the river, Option 1B has views of the river and the hillside. Option 1C considered not as good regarding aesthetics. Therefore, Options 1A and 1B are the same, then Option 1C (worst)
- ***On balance, Option 1C has the shortest length and has the shortest length of safety barriers, with aesthetics essentially similar between the routes. Therefore Option 1C best, followed by Option 1B, then Option 1A***

Section 2

- For the consideration of "Travel efficiency", Options 2C, 2A, 2F, 2B, 2E, 2D in order of decreasing length. Therefore Option 2D most efficient for travel
- For the consideration of "Safety":
  - Options 2C, then Options 2A/ 2D/ 2E (similar), followed by Options 2B, 2F in order of increasing length of safety barriers
  - Option 2F has greatest length of viaduct and safety barriers
- For the consideration of "Access points and links", the item was split into 2 parts (locally and to the highway):
  - For access locally:
    - Option 2E (best), followed by Options 2C, 2A, 2D, 2B and then Option 2F (worst) in increasing travel lengths
    - Option 2F is worst because of additional length of trips required to access highway
    - Option 2E has least length of trips to access highway locally
  - For access onto the proposed upgraded highway – Options 2C/ 2D/ 2E are similar, followed by Option 2F with Options 2A and 2B (worst)

- For the consideration of “Aesthetics from the highway”:
  - Option 2F provides good views of cane fields and Blackwall Ranges but not much variety
  - Options 2A & 2B provide views of the river and the Tuckean Broadwater. Therefore the options were grouped as follows – Options 2A, 2B, 2F – good aesthetics, Options 2D, 2C, 2E – poor aesthetics
- ***Difficult to rank, considering the variety of landscapes along the route options. However the overall ranking was agreed as Option 2E (best), followed by Options 2D, 2C, 2B, 2A and finally Option 2F (worst)***

Section 3

- For the consideration of “Travel efficiency”, Option 3A is slightly longer than Option 3B. Therefore, Option 3B is more efficient for travel
- For the consideration of “Safety”, Option 3A is slightly longer, no special safety provisions. Therefore, Option 3B is marginally better for safety
- For the consideration of “Access points and links”:
  - Interchanges are not a major consideration at corridor selection stage. However, Option 3A will require additional service roads compared with Option 3B. Therefore Option 3B is rated better
- For the consideration of “Aesthetics from the highway”, both options are difficult to differentiate on aesthetics. Therefore, Options 3A & 3B are rated the same
- ***Overall rating has Option 3B as best***

Potential Improvements for ongoing consideration identified by the Focus Group

- Cane haulage access needs further consideration
- Contact needs to be made with designers of the conveyor system to the sugar mill
- Rileys Hill Road will not support local traffic under the options being considered in Section 1. Functional improvements could be made by having the service roads parallel to the highway through the National Park which would require some minor additional National Park land resumption
- Option 2D can be improved by moving the corridor slightly west and up onto the sand ridge (minor additional impact on heath land). However there may be potential Aboriginal land impacts
- More detailed work is required to confirm viability of local/nearby quarry resources

Assessment of Corridor Options within the Social and Noise Perspective

Section 1	Social Perspective										
	Considerations Prompts		Relative noise increase	Number of noise receivers	Potential flood impacts	Limits to town development	Impacts on r/residential development	Aesthetics from community view	Number of residences lost in route footprint		
OPTIONS											
1A			E VG (G) F P	E VG G (F) P	E VG G (F) P	E VG G F P	E VG G F P	E VG G (F) P	E VG G F P	E VG G F P	E VG G F P
											RANK **2**
1B			E VG (G) F P	E VG G (F) P	E VG G (F) P	E VG G F P	E VG G F P	E VG G (F) P	E VG G F P	E VG G F P	E VG G F P
											RANK **2**
1C			E (VG) G F P	E (VG) G F P	E VG (G) F P	E VG G F P	E VG G F P	E VG (G) F P	E VG G F P	E VG G F P	E VG G F P
											RANK **1**

Section 2

	Social Perspective										
	Considerations **Prompts**		Relative noise increase	Number of noise receivers	Potential flood impacts	Limits to town development	Impacts on r/residential development	Aesthetics from community view	Number of residences lost in route footprint		
OPTIONS											
2A			E VG G F (P)	E VG (G) F P	E VG G F (P)	E VG (G) F P	E VG G F (P)	E VG G (F) P	E VG G F P	E VG G F P	E VG G F P	RANK **3**
2B			E VG G F (P)	E VG (G) F P	E VG G F (P)	E VG (G) F P	E VG G (F) P	E VG G (F) P	E VG G F P	E VG G F P	E VG G F P	RANK **3**
2C			E VG G (F) P	E VG G (F) P	E VG (G) F P	E VG (G) F P	E VG (G) F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	RANK **1**
2D			E VG G (F) P	E VG G F (P)	E VG G (F) P	E VG (G) F P	E VG G (F) P	E VG G (F) P	E VG G F P	E VG G F P	E VG G F P	RANK **2**
2E			E VG G (F) P	E VG G (F) P	E VG G (F) P	E VG G (F) P	E VG G (F) P	E VG G (F) P	E VG G F P	E VG G F P	E VG G F P	RANK **2**
2F			E VG (G) F P	E VG G F (P)	E VG G F (P)	E VG G (F) P	E (VG) G F P	E VG G F P	E VG G F P	E VG G F P	E VG G F P	RANK **1**

Section 3	Social Perspective											
	Considerations Prompts		Relative noise increase	Number of noise receivers	Potential flood impacts	Limits to town development	Impacts on r/residential development	Aesthetics from community view	Number of residences lost in route footprint			
OPTIONS												
3A			E VG G F (P)	E VG G F P	E VG G F P	E VG G F P	E VG G F (P)	E VG (G) F P	E VG G (F) P	E VG G F P	E VG G F P	RANK **2**
3B			E VG (G) F P	E VG G F P	E VG G F P	E VG G F P	E VG G (F) P	E VG G (F) P	(E) VG G F P	E VG G F P	E VG G F P	RANK **1**

Key Observations

Section 1

- In considering relative noise increases and number of receivers, Options 1A & 1B have approximately 55 receivers whereas Option 1C has approximately 5 receivers
- For the consideration of "Potential flood impacts", Options 1A & 1B are fair and Option 1C is slightly better
- For the consideration of "Limits to town development", it is not an issue in the Section (re: Woodburn's future) so it was not rated – not a differentiator between options
- For the consideration of "Impacts on rural residential development", Lang Hill is the only location of cluster development in the area and is approximately the same for each option so it was not rated – not a differentiator between options
- For the consideration of "Aesthetics from the community view", Option 1B is slightly better than Option 1A. Option 1C is the furthest from Woodburn so the greater number of people would say Option 1C was the best of the options
- For the consideration of "Number of residences lost in route footprint", the number of residences affected is approximately the same so it was not rated – not a differentiator between options

Section 2

- In considering relative noise changes and number of receivers, the focus group assumed that they all achieve a better result than the existing situation (due to bypass of towns). The ratings have been determined by the noise impact on previously unaffected areas
- For the consideration of "Impacts on rural residential development", impacts were viewed as worst for Option 2A
- For the consideration of "Aesthetics from the community view", there was major discord within the focus group regarding the ratings of Options 2C and 2F. There appeared different impressions regarding community view on aesthetics being either a change from the beauty already existing to a highway view or if we have a highway, can we design it to fit into the landscape with visual appeal. Accordingly Options 2C and 2F could not be rated by the focus group
- For the consideration of "Number of residences lost in route footprint", there was disagreement with the number of houses lost as against structures. The data provided at the workshop indicated the number of "structures" not houses. Accordingly the options could not be rated by the focus group
- ***Section 2 was the most contentious and sensitive of the sections to rank for the social and noise focus group***

Section 3

- In considering relative noise increases and number of receivers:
  - Option 3A diverges further from the highway, therefore greatest change in noise (negative impact)
  - It was flagged that in the consideration of impacts, the mitigability or unmitigability of the impact must be taken into account. The degree of difficulty in mitigating the impact varies for the options from poor to fair only
  - Option 3A has an amphitheatre effect with regards to reflective noise impact which needs to be considered
  - For Option 3B, the noise change may force RTA to mitigate better than the current situation, hence Option 3B rating is upgraded from fair to good
  - A 300m buffer zone needs to be considered for land form purposes (ie. visibility)
  - Number of noise receivers not differentiated by the focus group
- For the consideration of "Potential flood impacts", flood levels afflux no greater than 50mm. Some confusion as to whether the options are in flood plain. Not rated by the focus group
- For the consideration of "Limits to town development", it was considered not an issue in the Section so it was not rated – not a differentiator between options
- For the consideration of "Impacts on rural residential development", the focus group discussed how one would feel about having a road where there wasn't one before. Hence rated Option 3B better than Option 3A
- For the consideration of "Aesthetics from the community view", there was concern about a "scar" on the landscape if Option 3A is in the foothills, specifically when looking back from elevated positions in Ballina. However the urban designer believes that this can be addressed. Option 3A was rated better than Option 3B
- For the consideration of "Number of residences lost in route footprint", Option 3B rated better than Option 3A due to its proximity to the current highway footprint

Assessment of Corridor Options within the Business and Economic Perspective

Section 1	Business and Economic Perspective											
	Considerations / **Prompts**		Impact on cane production	Loss of regionally significant agricultural land	Road proximity to support towns	Other business impacts (e.g. quarries)						
OPTIONS												
1A			E	E	E	E	E	E	E	E	E	RANK
			VG	VG	VG	VG	VG	VG	VG	VG	VG	
			G	G	G	G	G	G	G	G	G	**3**
			F	F	F	F	F	F	F	F	F	
			P	P	P	P	P	P	P	P	P	
1B			E	E	E	E	E	E	E	E	E	RANK
			VG	VG	VG	VG	VG	VG	VG	VG	VG	
			G	G	G	G	G	G	G	G	G	**2**
			F	F	F	F	F	F	F	F	F	
			P	P	P	P	P	P	P	P	P	
1C			E	E	E	E	E	E	E	E	E	RANK
			VG	VG	VG	VG	VG	VG	VG	VG	VG	
			G	G	G	G	G	G	G	G	G	**1**
			F	F	F	F	F	F	F	F	F	
			P	P	P	P	P	P	P	P	P	

Section 2

	Business and Economic Perspective										
	Considerations **Prompts**		Impact on cane production	Loss of regionally significant agricultural land	Road proximity to support towns	Other business impacts (cane haulage to mills)	Quarry impacts				
OPTIONS											
2A			E	E	(E)	E	E	E	E	E	E
			VG	(VG)	VG	VG	VG	VG	VG	VG	VG
			G	G	G	(G)	(G)	G	G	G	G
			(F)	F	F	F	F	F	F	F	F
			P	P	P	P	P	P	P	P	P
RANK **5**											
2B			E	E	E	E	E	E	E	E	E
			VG	VG	(VG)	VG	VG	VG	VG	VG	VG
			G	G	G	(G)	(G)	G	G	G	G
			(F)	(F)	F	F	F	F	F	F	F
			P	P	P	P	P	P	P	P	P
RANK **4**											
2C			E	E	E	E	E	E	E	E	E
			VG	(VG)	VG	VG	VG	VG	VG	VG	VG
			G	G	(G)	(G)	G	G	G	G	G
			(F)	F	F	F	F	F	F	F	F
			P	P	P	P	(P)	P	P	P	P
RANK **3**											
2D			E	E	E	E	(E)	E	E	E	E
			(VG)	VG	VG	(VG)	VG	VG	VG	VG	VG
			G	(G)	G	G	G	G	G	G	G
			F	F	F	F	F	F	F	F	F
			P	P	(P)	P	P	P	P	P	P
RANK **2**											
2E			E	E	E	(E)	(E)	E	E	E	E
			(VG)	VG	VG	VG	VG	VG	VG	VG	VG
			G	(G)	(G)	G	G	G	G	G	G
			F	F	F	F	F	F	F	F	F
			P	P	P	P	P	P	P	P	P
RANK **1**											
2F			E	E	E	E	(E)	E	E	E	E
			VG	VG	VG	VG	VG	VG	VG	VG	VG
			G	G	G	G	G	G	G	G	G
			F	F	F	F	F	F	F	F	F
			(P)	(P)	(P)	(P)	P	P	P	P	P
RANK **6**											

Section 3	Business and Economic Perspective											
	Considerations Prompts		Impact on cane production	Loss of regionally significant agricultural land	Road proximity to support towns	Other business impacts (e.g. quarries)						
OPTIONS												
3A			E	E	E	E	E	E	E	E	E	RANK
			VG	VG	VG	VG	VG	VG	VG	VG	VG	
			G	G	G	G	G	G	G	G	G	2
			(F)	F	F	F	F	F	F	F	F	
			P	(P)	P	P	P	P	P	P	P	
3B			(E)	E	E	E	E	E	E	E	E	RANK
			VG	(VG)	VG	VG	VG	VG	VG	VG	VG	
			G	G	G	G	G	G	G	G	G	1
			F	F	F	F	F	F	F	F	F	
			P	P	P	P	P	P	P	P	P	

Key Observations

Jeff Brownlow (DPI) made the following observations:

- It was noted that quarries did not feature in technical presentations.
- The graphics of acid sulphate soil potential indicated only area distribution and lacked data on depths, thicknesses plus pyrite contents and lacked a quantitative analyses of engineering/ cost significance.

Section 1

- For the consideration of "Impact on cane production", the cane industry does not like any of the options (ie. Options 1A, 1B, 1C) due to the perceived flooding impacts and would like to have the alternative option (called the "Flood Free" route option) considered. However of the options shortlisted, Option 1C is significantly better than Options 1A & 1B as it skirts the area
- For the consideration of "Loss of regionally significant agricultural land", Option 1C has slightly less impact
- For the consideration of "Road proximity to support towns":
  - There is a need to consider the proximity of interchanges
  - Townships need the ability and room to develop
  - There are issues with Options 1A & 1B being closer to the river with potential impact on river industry
  - Off ramp near the junction of Rileys Hill Road and the existing highway will allow travel along river
- For the consideration of "Other business impacts", the focus in this section is township businesses (no quarries exist in Section 1). The long term impacts are greater than short term impacts so there is a preference for the option being further away from the town (ie. marginally Option 1C is better than Option 1B which is better than Option 1A)

Section 2

- For the consideration of "Impact on cane production", the most impact would be Option 2F (poor), the least impact would be Options 2D & 2E (very good). There would be family issues around Cooks Hill (social) which would be impacted by Option 2D. Options 2A & 2B would have the same impact (includes haulage impacts). Options 2A, 2B and 2C would only be fair
- For the consideration of "Loss of regionally significant agricultural land", the greatest impact would be Option 2F (prime agricultural land). Option 2E would impact on subdivisions (Maloney's

property). Options 2A & 2C would have the least impact followed by Options 2E & 2D, then Option 2B with Option 2F the worst impact

- For the consideration of "Road proximity to support towns", at Broadwater there is a need to be mindful of local through traffic (ie. maintain access). Options rate from Option 2A, then Options 2B, 2C, 2E, 2D and finally Option 2F. At Wardell, Option 2F impacts on the caravan park. Options 2A & 2B do not sever the coast from the beach area and are further away from both Broadwater and Wardell
- For the consideration of "Other business impacts", this point was divided into cane haulage to mill and quarry impacts. For cane haulage to mill, mapping indicated that Option 2F had greatest impact, followed by Options 2A, 2B & 2C which had a medium impact and Options 2D & 2E with the lowest impact. For quarry impacts, Options 2C & 2E have existing quarries on the routes which service existing districts. Options 2D and 2F are excellent with Options 2A & 2B having minor quarries in between
- ***The overall ranking of options has been undertaken under the assumption that the issues associated with the quarries on the corridor options can be managed or resolved (particularly for Options 2C & 2E)***

Section 3

- For the consideration of "Impact on cane production", the existing infrastructure is aligned with Option 3B. With Option 3A, there would be a need to change farming set up (ie. pads, etc). There could be proposed expansion for cane production in Option 3A
- For the consideration of "Loss of regionally significant agricultural land", Option 3A has significant loss
- The consideration of "Road proximity to support towns" and "Other business impacts" are not applicable for this section
- ***Overall Option 3B is far superior than Option 3A from a Business and Economic perspective***

Summary of Preliminary Project Cost Estimates

As project cost estimates were still to be determined, preliminary information was presented to the workshop to give an understanding of the relative nature of the unit costs of the various corridor options in each section for comparative purposes.

The preliminary project cost estimates included:

- Project development costs
- Investigation and design costs
- Property acquisition costs
- Public utility adjustments costs
- Construction costs
- Handover costs

The preliminary project cost estimates appear below as presented to the group and are relative as at year 2005. For the purposes of comparison in each Section, Option A was assigned 100 cost units and each other option in that Section relatively compared as a percentage against Option A. The comparisons appear below.

Section 1

Corridor Options	Cost (%) relative to Option A for this Section
Option 1A	100
Option 1B	88
Option 1C	86

Section 2

Corridor Options	Cost (%) relative to Option A for this Section
Option 2A	100
Option 2B	109
Option 2C	93
Option 2D	88
Option 2E	84
Option 2F	160

Section 3

Corridor Options	Cost (%) relative to Option A for this Section
Option 3A	100
Option 3B	98

Summary of Corridor Option Assessment Rankings

A summary of the rankings of the corridor options against the various perspectives together with the cost estimates presented earlier appears below

Section 1 – Ranking of Corridor Options

	Perspectives					
Option	**Environmental**	**Heritage**	**Functional**	**Social & Noise**	**Business & Economic**	**Cost (units)**
1A	1	3	3	2	3	100
1B	2	2	2	2	2	88
1C	3	1	1	1	1	86

Section 2 – Ranking of Corridor Options

	Perspectives					
Option	**Environmental***	**Heritage**	**Functional**	**Social & Noise**	**Business & Economic***	**Cost (units)**
2A	4	1	5	3	5	100
2B	4	3	4	3	4	109
2C	2 (3)	4	3	1	3	93
2D	3 (2)	5	2	2	2	88
2E	3 (2)	6	1	2	1	84
2F	1	2	6	1	6	160

* It should be noted that upon reflection during this stage of the workshop, the focus group who assessed the Environmental perspective revisited their findings and believed they had incorrectly interpreted impact on a particular aspect in the area north west of Wardell being the recently documented State Significant Remnant Vegetation Zone and the amount of salt marsh impacted. This caused them to re-rank Option 2C lower (as indicated in brackets in the above table) with respect to Options 2D & 2E as Option 2C traverses through this area (as does Options 2A & 2B. Options 2A & 2B remain at a lower ranking as they also create further problems in the southern area of the Section.

Also it should be noted that the ranking of corridor options from a Business and Economic perspective is based on the assumption that the quarry issues identified can be resolved or managed.

Section 3 – Ranking of Corridor Options

	Perspectives					
Option	**Environmental**	**Heritage**	**Functional**	**Social & Noise**	**Business & Economic**	**Cost (units)**
3A	2	2	2	2	2	100
3B	1	1	1	1	1	98

Recommending a Preferred Direction

As a result of the work undertaken above, the group (in focus groups) was asked “Which corridor option should be recommended as the preferred option to move forward for refinement and more detailed investigation to progress the project as well as the reasons why”. However, the preference is “subject to” the issues identified being addressed. Also a fallback option was to be nominated should the preferred corridor option later turn out not to be feasible.

One focus group examined Section 1 of the Study Area, another focus group examined Section 3 and three focus groups reviewed Section 2. Their findings were then discussed, amended (if required) and finally agreed as to the direction forward.

The focus group conclusions are recorded below.

Focus group examining Section 1

We prefer Option1C as the preferred corridor to progress the project.

Because:

- It performs better on all criteria other than from an environmental perspective

Subject to:

- Investigating the feasibility of avoiding or minimising impacts of removing vegetation, EECs and threatened species in the alignment

Fallback position:

- Option 1B because it is the next best option on all criteria identified

Focus group examining Section 3

We prefer Option 3B as the preferred corridor to progress the project.

Because:

- It performs better on all criteria and is best value for money

Subject to:

- Confirming the road footprint for Option 3B and the impact on sugar cane land (if any)

Fallback position:

- Not nominated

Focus groups examining Section 2

Focus group 1

We prefer Option 2C as the preferred corridor to progress the project.

Because:

- It performs well from a social, noise and environmental perspective
- It performs reasonably from a functional, business and economic perspective
- It is reasonably cost effective

Subject to:

- Improving the alignment around Cooks Hill

- Clarifying and managing the quarry issues (Broadwater and Bagotville)
- Managing the heritage issues

Fallback position:

- Option 2D because of its high relative ranking functionally, socially and economically and low relative cost. However this is subject to improving the alignment around Cooks Hill and managing/avoiding the heritage issues

Focus group 2

We prefer Option 2E as the preferred corridor to progress the project.

Because:

- It performs best from a functional, business and economic perspective
- It performs reasonably (mid range) from an environmental, social and noise perspective
- It is reasonably cost effective

Subject to:

- Satisfactorily resolving the heritage issues

Fallback position:

- Option 2C because its overall mid range position in rank and its high relative ranking socially and economically

Focus group 3

Could not agree on a preferred option but drew the following conclusions:

- Options 2D & 2E are high risk options (traverse through Jali land, land claims, heritage issues, etc)
- Options 2A & 2B do not have many positives environmentally, functionally, business and economically
- Option 2C is feasible subject to mitigation of environmental and heritage issues including ESD issues. However it is believed by some participants that it is not possible to achieve ESD on Option 2C due to unmitigable impacts
- Option 2F is feasible subject to being prepared to pay over 60% more than Option 2C as well as having a poor performance outcome functionally, business wise and economically (it is believed by some participants that it is not feasible to fund Option 2F at such additional cost burden)

Conclusions Drawn from the Workshop

As a result of the discussions over the two days of the workshop, the group agreed to the following conclusions:

- From the short listed corridor options reviewed in the workshop, there was unanimous support for Option 1C in Section 1 and Option 3B in Section 3 moving forward for more detailed investigation, development and refinement to progress the project
- In Section 2 of the Study Area, there was agreement that:
  - All the options examined have issues and risks
  - Options 2A and 2B should not be further pursued
  - Option 2C has possibilities subject to resolving the heritage issues, quarry issues, environmental issues, etc. However, Options 2D, 2E and 2F have also been mentioned as possibilities subject to further investigation to resolve issues mentioned during the workshop

Where to From Here?

At the conclusion of the workshop, an Action Plan was produced which outlined the direction and process to be undertaken by the Study Team and others to move the project forward from here.

No.	Task	By Whom	By When
1.	Deal with the issues and concerns tabled in light of the specialist presentations and information shared during the workshop	Shane Higgins/ Hyder Study Team	End July 2005
2.	Understand and resolve the quarry impacts and issues with regard to the preferred corridor options in Section 2	Shane Higgins/ Hyder Study Team	Concept Design Stage
3.	Establish an Aboriginal heritage focus group and finalise inputs for option consideration	Shane Higgins/ Mary-Lou Buck	End August 2005
4.	Secure a copy of the RTA Greenhouse Report for the Study Team and the CLG	David Corry	End July 2005
5.	Revisit/review other options should immitigable impacts arise on the shortlisted preferred options	Shane Higgins/ Hyder Study Team	Prior to Preferred Option Report
6.	Investigate source materials and the cost for the road construction	Shane Higgins/ Hyder Study Team	Concept Design Stage
7.	Clarify how the RTA has addressed greenhouse gas emission implications of the options	Shane Higgins/ Hyder Study Team	Prior to Preferred Option Report
8.	Determine how the alternative option (“flood free route” option) will be assessed relative to the shortlisted options	Shane Higgins/ Hyder Study Team	Prior to Preferred Option Report

Appendix 4. Presentation by Bert Plenkovich, CLG representative and Hyder Consulting on an Alternative Corridor Option

Flooding & the Sugar Industry on the Richmond River Floodplain

Presentation to the Value Management Workshop

20th & 21st July 2005

BM Plenkovich

- The catchment area is 6,892 sq klms comprising of 3 major areas being:
  - Wilson River approx 1,587 sq klms
  - Richmond River to Casino/Kyogle 2,716 sq klms
  - Bungawalbyn Catchment 2,589 sq klms
- Only 2 drainage points exist to drain the Richmond River of floodwater
  - One is the Richmond River itself to Ballina
  - The other is the Tuckombil Canal and Evans River

- Current natural bottlenecks to the release of floodwater are:
  - “Hairpin” bend in the Richmond River at Dungarubba some 3 klms upstream from the township of Broadwater

- Pelican Island
- Sharp bend in the Richmond River at Broadwater
- The recent flood has also shown that the current configuration of the Tuckombil Canal has considerably delayed the release of floodwaters in low lying areas

- Any further obstructions to the flow of floodwaters will cause:
  - Delay in the release of floodwaters
  - Increased duration of flooding
    - On lower floodplain Lismore City and Richmond Valley Council indicate 3,500 people isolated unable to access work & community services and would create social & economic problem

- increased inundation of low lying areas
  - Household losses, crop losses, agistment of cattle, etc
- Possible effect on areas previously considered as having minimal concern from floods

- Possible Route Option Obstructions
  - Routes 1A, 1B & 1C
    - The river area parallel to these routes overflows across the existing Pacific Highway in major flood events
    - Is a release value for flooding with water flowing back to the Evans River

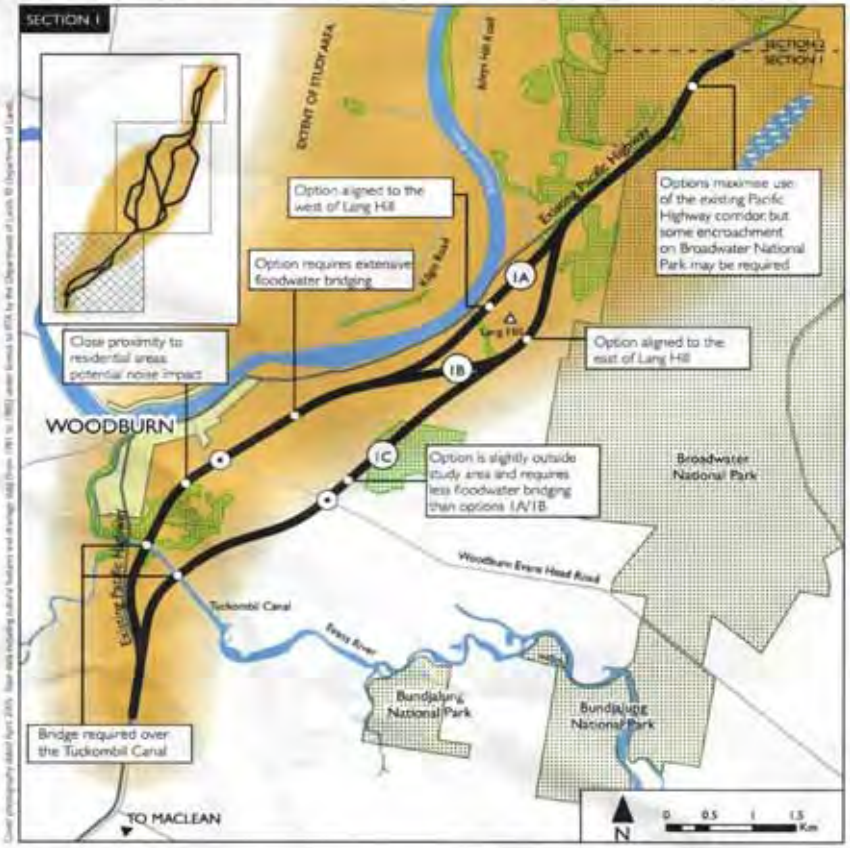
- Any further obstructions in this area with levee or culvert type constructions will create barriers to the escape of floodwaters
- Would cause increased flooding in the lower catchment
- These problems can be avoided by adoption of the “Flood Free” Route option

The NSW Roads and Traffic Authority is in the process of identifying a highway upgrade route from the south of Woodburn to the approved Ballina Bypass.

This community update describes the route options that have been shortlisted for community consideration and the key issues associated with each of the options. **The route options are on display from 23 May to 17 June 2005.**

For this study area the route options can be linked together in many different ways. There are decisions to be made about a preferred route in the southern, the central and the northern parts of the study area.

The RTA invites you to consider each of the three sections and provide your comment on the feedback form included here or available by contacting the project information line.



Option	1A	1B	1C
Route length (km)	11.4	11.8	11.2
Percentage of option within the 1 in 100 year flood plain	78%	76%	76%
Approximate number of private properties within 250m corridor	90	90	45

- Possible Route Option Obstructions
  - Routes 2A & 2B (at Richmond River crossing)
    - Normal width of the river at 2A bottleneck is 250 metres and during major floods the river width increase to about 600 metres
    - Any structure at 2A or 2B would greatly restrict flow causing further increased inundation and duration in areas above these points
    - Large sugarcane farming area and community of Riley's Hill would be significantly disadvantaged by either of these routes

- Both route options cross the highly valued areas of habitat of the Tuckean Broadwater wetlands

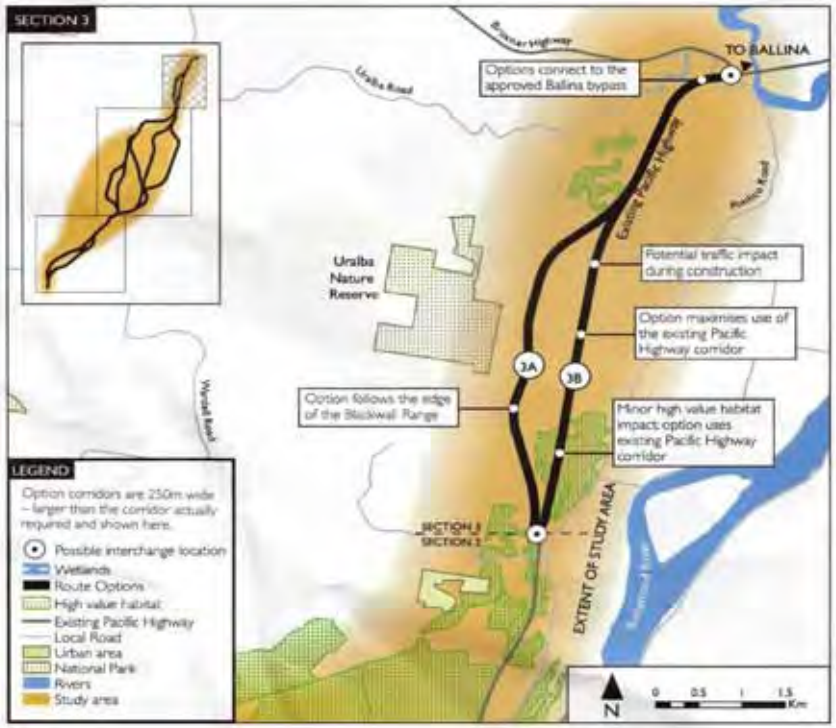
- There are also concerns for flood effects for the Northern section of these proposed routes at Meerschaumvale/Lumley's Lane area and southern area of the Blackwall Range

Option	2A	2B	2C	2D	2F
Route length (km)	16.9	15.8	17.2	15.4	16.1
Percentage of option within the 1 in 100 year flood plain	29%	27%	26%	58%	74%
Approximate number of private properties within 250m corridor	80	70	95	90	100

TYPICAL CROSS SECTION

*Options for local access include using the existing highway upgrading local roads, or new local access roads.

This cross section shows a typical arrangement of a highway upgrade, with a 12 metre wide median and 32 metres from shoulder to shoulder. The final arrangement may vary as conditions, for example topography, change.



Option	3A	3B
Route length (km)	6.7	6.4
Percentage of option within the 1 in 100 year flood plain	0%	33%
Approximate number of private properties within 250m corridor	35	40

- Sugar Industry Comment
  - The Pacific Highway upgrade will pass through the 3 cane growing areas with the potential to impact significantly on cane land and the economy of the region
  - The industry has been operating in NSW since 1882 and currently generates over $200 million to the region each year and employs over 2,000 people
  - Given the current state of the industry we cannot afford to lose cane land and hence throughput to the Co-operatively owned mills

- Sugar Industry Comment (cont…)
  - Individual growers located on particular routes would see their farms become unviable through either total loss of productive area or fragmentation
  - In certain localities the loss of cane land will directly effect the continued viability of harvesting groups

– Losses to the sugar industry are significant for routes 1A & 1B, 2A & 2B, part 2C, 2F and 3A as shown in the table

ROUTE OPTION	TONNES OF CANE LOST	HECTARES OF CANE LAND LOST	% of BROADWATER MILL AREA PRODUCTION LOST
1A	26,200	476	2.62
1B	26,200	476	2.62
1C	4,500	73	0.45
2A	10,500	141	1.05
2B	11,000	148	1.10
2C*	7,500	128	0.75
2D*	4,500	49	0.45
2E	650	7	0.07
2F*	37,500	406	3.76
3A	5,500	64	0.55
3B	Unknown	Unknown	Unknown

– Worse case scenario is lose of 70,000 tonnes of sugarcane and approx 1,000 hectares of irreplaceable prime agricultural land

- Sugar Industry Comment (cont…)
  - Industry's Preferred Option
    - Creates a basically flood free route
    - Minimises impact on the townships of Wardell and Jali communities , Broadwater and Riley's Hill communities and town of Woodburn

- Creates a first ever flood free access to Evans Head
- Minimal Impact on Prime Agricultural Land although it is realised that there is significant loss to one property north of Broadwater
- Would appear to also be the most cost effective to build

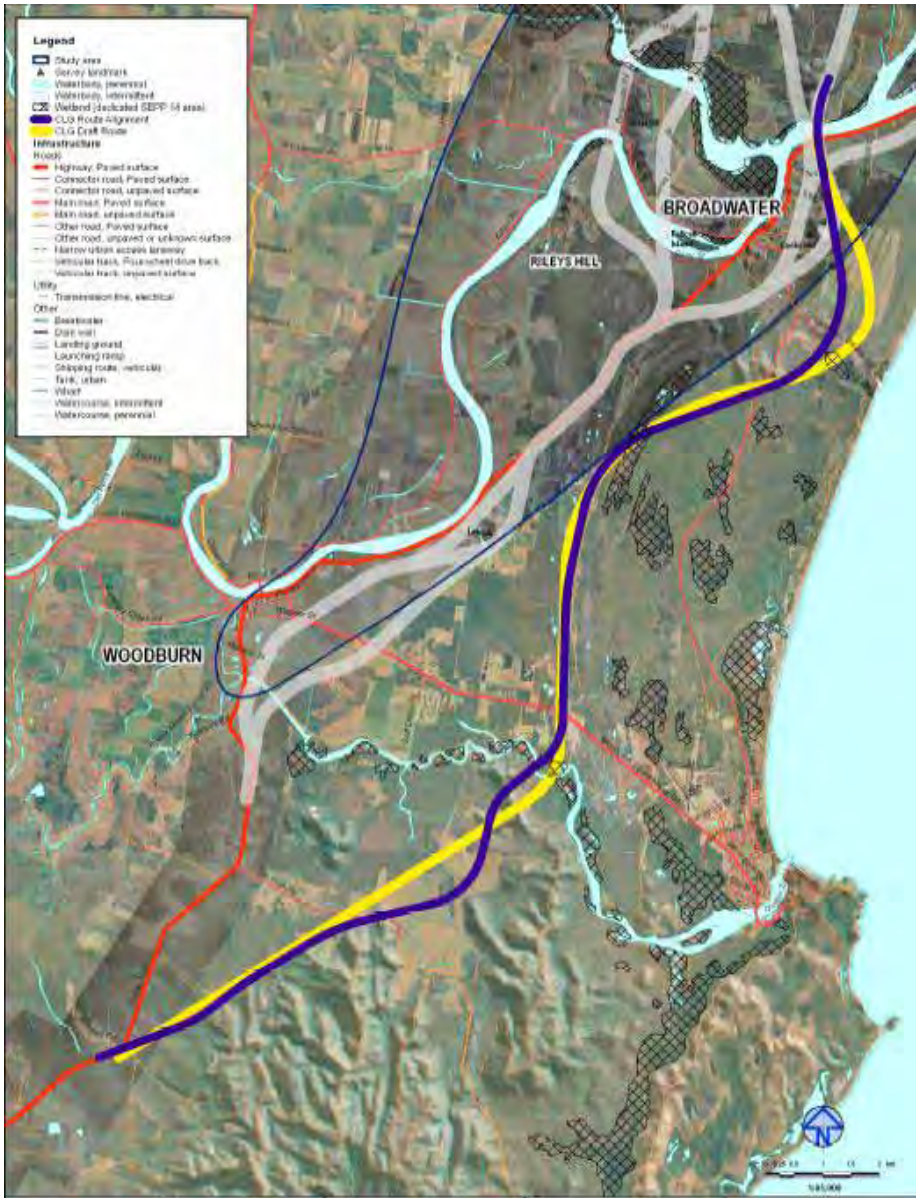
- Closing Comment

  Unfortunately there seems to be 2 sets of standards with on the one hand the State Government having in place a policy to preserve agricultural land while appearing to distance themselves from this goal in terms of highway construction

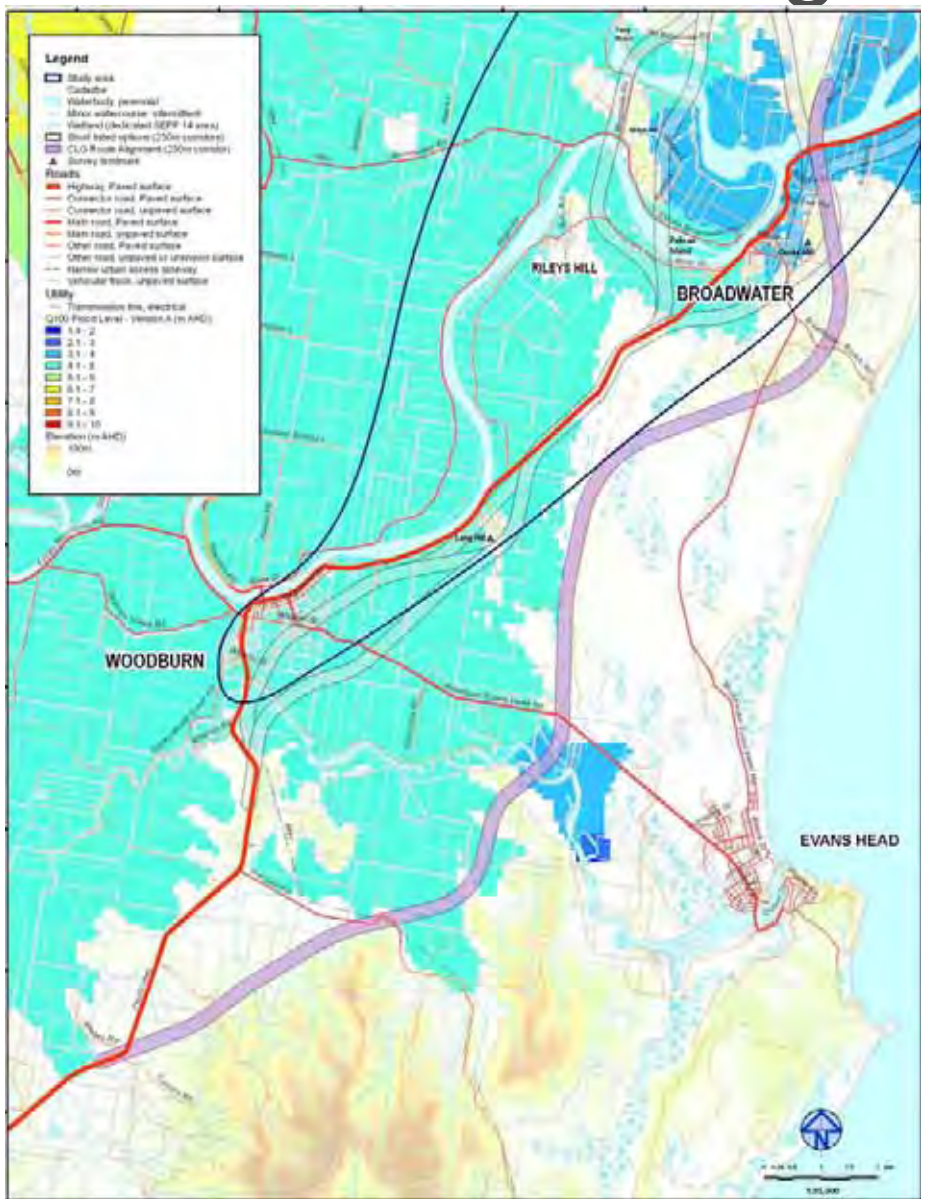
CLG Route – Preliminary Investigation by Hyder Study Team

Route considered in Route Options Development Report

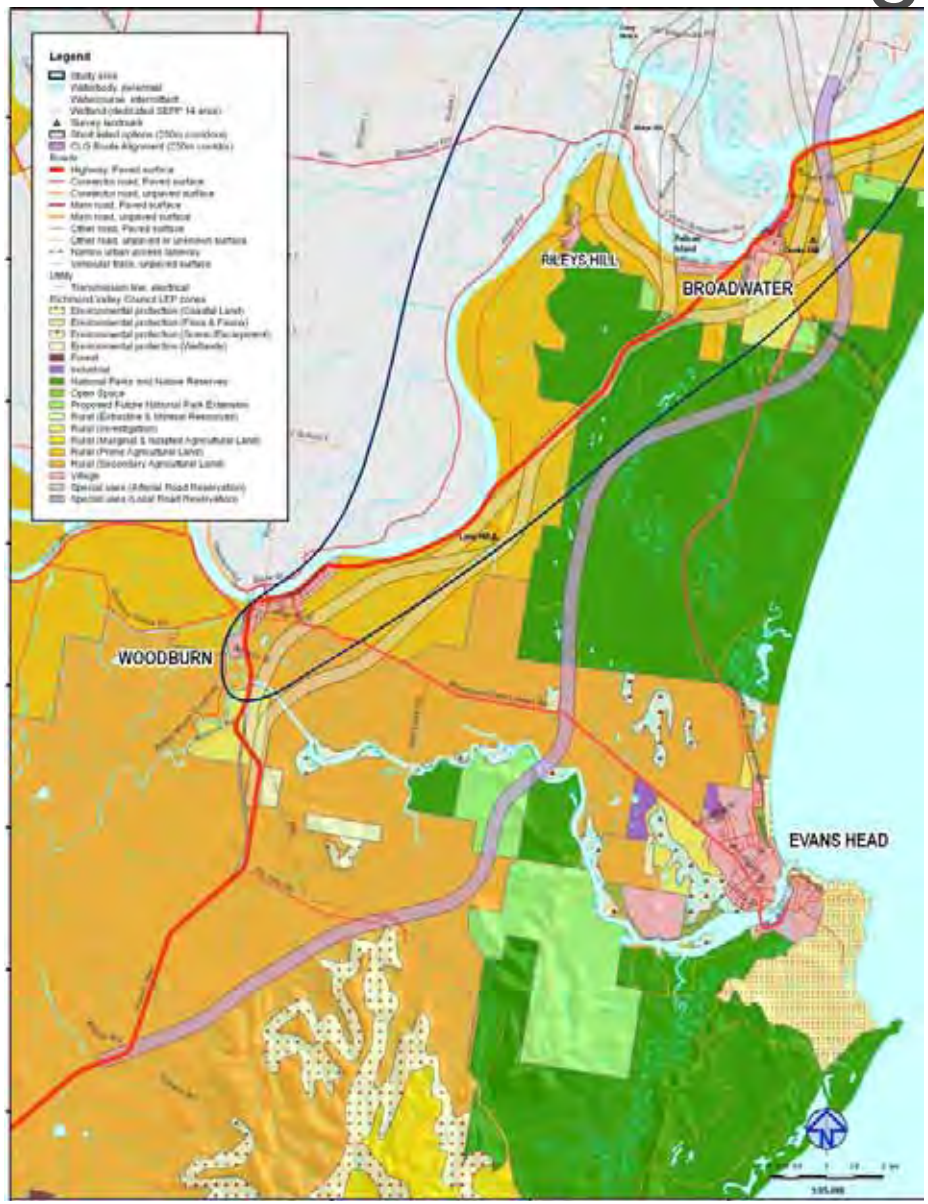
CLG Route



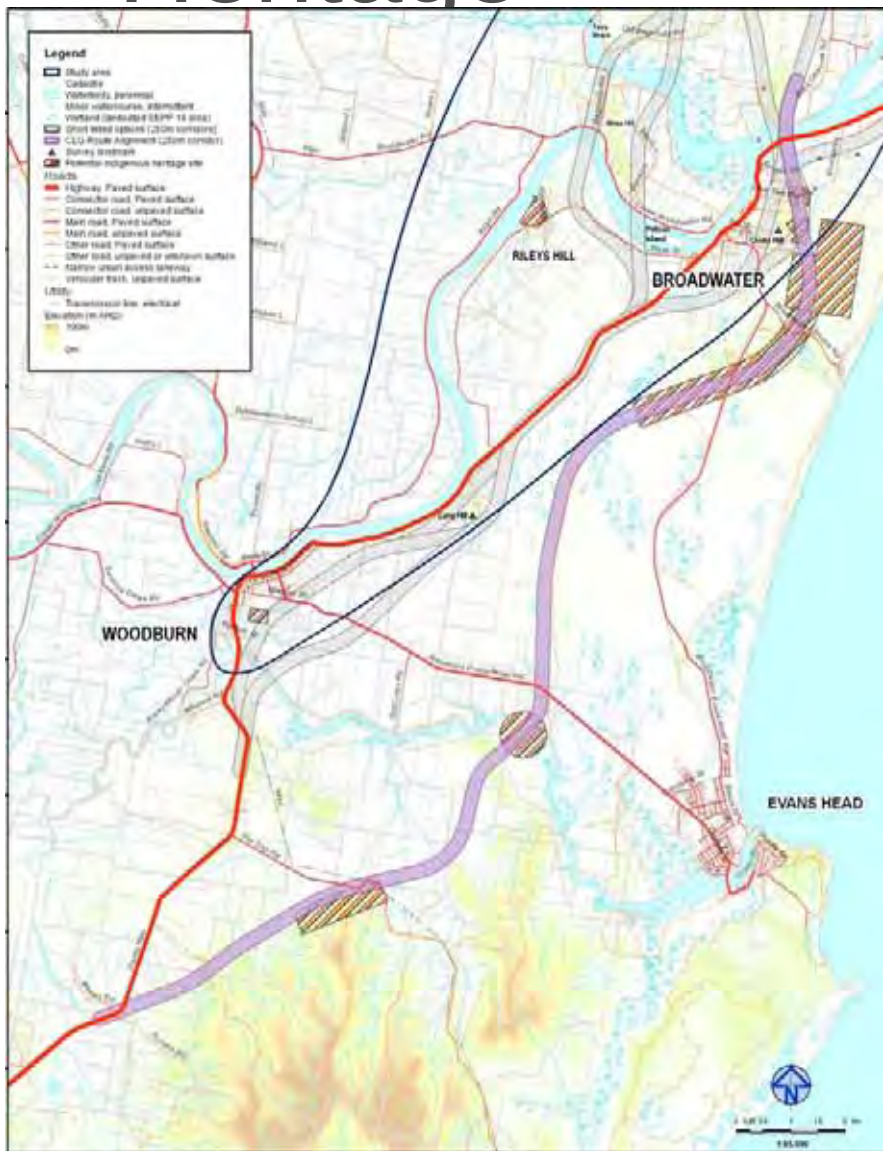
CLG Route - Flooding



CLG Route – LEP Zoning



CLG Route – Potential Indigenous Heritage



CLG Route

	ENGINEERING	
OPTION	**ADVANTAGES**	**DISADVANTAGES**
1C+2E (+ 6.5km upgrade to south)	Reuse of Existing Hwy	Highest Acid Sulphate Soil risk (46Ha additional) Longest length of Bridges/viaducts (780m additional) Highest earthworks volumes (14% additional volume) Longest length over deep soft soils
CLG Route	Lowest Acid Sulphate Soil risk Shortest length of Bridges / Viaducts. Lowest earthworks volumes Shortest length over deep soft soils Potential for flood protected access for Evans Head	Construction of additional 6.5km of new Hwy

CLG Route

	LANDUSE	
OPTION	**ADVANTAGES**	**DISADVANTAGES**
1C+2E (+ 6.5km upgrade to south)		Higher impact on Cane Farming
CLG Route	Minimum impact on cane farming	

CLG Route

	ENVIRONMENTAL	
OPTION	**ADVANTAGES**	**DISADVANTAGES**
1C+2E (+ 6.5km upgrade to south)	Least impact on National Park Least impact on Threatened Species Least impact on Endangered Ecological Communities	
CLG Route		Significant potential Impact on National Park Significant potential impact on Threatened Species Significant potential impact on Endangered Ecological Communities Highest risk of impact on fisheries in the Evans River DEC and Fisheries have provided strong advice supporting the ecological impacts likely to arise

CLG Route

	ABORIGINAL HERITAGE	
OPTION	**ADVANTAGES**	**DISADVANTAGES**
1C+2E (+ 6.5km upgrade to south)	Smallest areas of potential cultural sites affected	
CLG Route		Broad areas of high cultural significance traversed (Evans River, East of Cooks Hill

Appendix 5. Study Team Presentations

Corridor Option Review

Harry Batt

Short list of options

Visual/Urban Design

Mary-Anne McGirr

Visual/Urban Design
Section 1: Option 1A

Advantages / Strengths / Opportunities

- Lower embankment heights than Option 1C – generally 4 metre plus
- Interesting and varied view experience includes:
  - Views to Woodburn
  - Views to Richmond River
  - Canefields
  - Views to Langs Hill
  - Broadwater National Park

Visual/Urban Design
Section 1: Option 1A

Disadvantages/ Weaknesses

- Increases visual and physical severance of the Richmond River
- Proximity to Woodburn- potential noise and visual issues at Woodburn
- Exaggerates height of the river embankment from the river due to additional road embankments
- Does not correspond to landscape patterns – cuts through the middle of cane fields
- High visual impact as route is close to Woodburn and the Richmond River

Visual/Urban Design
Section 1: Option 1B

Advantages/ Strengths/ Opportunities

- Same as 1A except route passes east of Langs Hill
- Lower embankment heights than Option 1C – generally 4 metre plus
- Interesting and varied view experience includes:
  - Views to Woodburn
  - Views to Richmond River,
  - Canefields,
  - Views to Langs Hill
  - Broadwater National Park

Visual/Urban Design
Section 1: Option 1B

Disadvantages/ Weaknesses

- Exaggerates height of the river embankment from the river due to additional road embankments
- Increases visual and physical severance of the Richmond River although less than Option 1A
- Proximity to Woodburn- potential noise and visual issues
- Does not correspond to landscape patterns – cuts through the middle of cane fields
- Medium- high visual impact as route is close to Woodburn and the Richmond River – different from 1A as this route is east of Langs Hill

Visual/Urban Design
Section 1: Option 1C

Advantages/ Strengths/ Opportunities

- Follows junctions of landscape types
- Route is through the middle of pasturelands rather than cane fields
- Captures significant amounts of existing vegetation – woodland along edge of National Park
- Option is not located along the Richmond River edge therefore no severance issues
- Distant from Woodburn therefore less impact on amenity of the town
- Route traverses less sensitive landscape – mostly pasturelands

Visual/Urban Design
Section 1: Option 1C

Disadvantages/ Weaknesses

- Large embankment heights – significant amounts 6 metres plus
- Less varied and rich visual experience as there are no/ limited views to Woodburn or the Richmond River
- Visual impact is medium-high as although the magnitude of proposal is high, the spatial precinct sensitivity is low and there is less impact on Woodburn and the Richmond River

Visual/Urban Design
Section 2: Option 2A

Advantages/ Strengths/ Opportunities

- Generally follows the junctions of landscape types – edge of BN Park, edge of Blackwall Range
- Exceptional landscape and River crossings experience includes:
- Views to Rileys Hill
- Views to Richmond River,
- Canefields,
- Views to Alleys Hill
- Broadwater National Park edge
- Tuckean Broadwater
- Foothills of the Blackwall Mountain Range

Visual/Urban Design
Section 2: Option 2A

Disadvantages/ Weaknesses

- Varied embankment heights 2-6 metres
- Two river crossings with significant embankments on the Richmond River bridge approaches due to height clearance requirements
- Passes through single landscape types at River, Tuckean Broadwater
- Passes through middle of cane fields around Tuckean Broadwater and pasturelands in the foothills of the Blackwall Range
- Route is close to Rileys Hill community – potential visual and amenity issues

Visual/Urban Design
Section 2: Option 2A

Disadvantages/ Weaknesses (cont.)

- Close to Meridian Heights settlement in plan (although vertically distant)
- Route traverses existing fringe rural countryside
- Medium- high visual impact as the route passes through visually sensitive landscapes with embankments of significant height

Visual/Urban Design
Section 2: Option 2B

Advantages/ Strengths/ Opportunities

- Generally follows the junctions of landscape types – edge of BN Park, edge of Blackwall Range
- Reasonably distant from all towns and settlements
- Exceptional landscape and River crossings experience includes:
- Views to Richmond River,
- Canefields,
- Views to Alleys Hill
- Views to Sugar Mill
- Tuckean Broadwater
- Foothills of the Blackwall Mountain Range

Visual/Urban Design
Section 2: Option 2B

Disadvantages/ Weaknesses

- Varied embankment heights 2-6 metres
- Two river crossings with significant embankments on approaches to both bridges due to height clearance requirements
- Potential impacts on residences along Rileys Hill Road
- Medium visual impact – the route passes through visually sensitive landscape with embankments of medium height and avoids any major rural settlements
- Route traverses existing fringe rural countryside

Visual/Urban Design
Section 2: Option 2B

Disadvantages/ Weaknesses (cont.)

- Passes through middle of single landscape types at Richmond River, Tuckean Broadwater
- Passes through middle of cane fields around Tuckean Broadwater and pasturelands in the foothills of the Blackwall Range
- Close to Meridian Heights settlement in plan (although vertically distant)

Visual/Urban Design
Section 2: Option 2C

Advantages/ Strengths/ Opportunities

- Embankment heights generally less than 4 metres
- Long sections of the route closely follow junctions of landscape types – edge of BN Park, edge of Blackwall Range, edge of heathlands
- Substantial lengths of corridor adjacent or through existing vegetation
- Distant from Wardell township

Visual/Urban Design
Section 2: Option 2C

Advantages/ Strengths/ Opportunities (cont.)

- Potentially rich and varied experience includes:
  - Vista to Buckombil Mountain,
  - Views to Broadwater,
  - Views to Sugar Mill,
  - edge of heathland/ woodland
  - Foothills of the Blackwall Mountain Range
  - Views to Cooks Hill
  - Views to Laws Hill
- Opportunity to improve this route by taking the alignment to the east of Cooks Hill, avoiding Broadwater – potentially better visual and acoustic amenity for town

Visual/Urban Design
Section 2: Option 2C

Disadvantages/ Weaknesses

- Proximity to Broadwater – potential noise and visual issues (less of an issue if re-aligned east of Cooks Hill)
- Route traverses existing fringe rural countryside in the foothills of the Blackwall Range
- Passes through single landscape type – middle of cane fields around Cooks Hill/ Broadwater and pasturelands in the foothills of the Blackwall Range
- Close to Meridian Heights settlement in plan (although vertically distant)
- Medium visual impact – the route passes generally through medium sensitivity landscapes with embankments of medium height

Visual/Urban Design
Section 2: Option 2D

Advantages/ Strengths/ Opportunities

- Embankment heights generally less than 4 metres and in long continuous stretches
- Long sections of the route closely follow junctions of landscape types – edge of Broadwater National Park, edge of heathlands
- Substantial lengths of corridor adjacent or through existing vegetation
- One bridge crossing only

Visual/Urban Design
Section 2: Option 2D

Advantages/ Strengths/ Opportunities (cont.)

- Potentially varied experience includes:
  - Views to Broadwater and possibly Wardell,
  - Views to Sugar Mill,
  - Views to Wardell Bridge
  - edge of heathland/ woodland
  - Views to Cooks Hill
  - Views to Laws Hill

Visual/Urban Design
Section 2: Option 2D

Disadvantages/ Weaknesses

- Proximity to Broadwater and Wardell – potential noise and visual issues
- Medium visual impact – the route passes generally through medium sensitivity landscapes with embankments of medium height
- No visual experience of foothills of the Blackwall Mountain Range
- Clearance/severance of heathland west of Wardell

Visual/Urban Design
Section 2: Option 2D

Advantages/ Strengths/ Opportunities

- Similar to Option 2D – except route passes east of Cooks Hill
- Embankment heights generally less than 4 metres and in long continuous stretches – embankments are lower east of Cooks Hill than those west of Cooks Hill
- Long sections of the route closely follow junctions of landscape types – edge of Broadwater National Park, edge of heathlands
- Substantial lengths of corridor adjacent or through existing vegetation

Visual/Urban Design
Section 2: Option 2E

Advantages/ Strengths/ Opportunities (cont.)

- Separated from Broadwater township by Cooks Hill
- One bridge crossing only
- Potentially varied experience includes:
  - Views to Broadwater and possibly Wardell,
  - Views to Sugar Mill,
  - Views to Wardell Bridge
  - edge of heathland/ woodland
  - Views to Cooks Hill
  - Views to Laws Hill

Visual/Urban Design
Section 2: Option 2E

Disadvantages/ Weaknesses

- Proximity to Wardell – potential noise and visual issues
- Medium visual impact – the route passes generally through medium sensitivity landscapes with embankments of medium height
- No visual experience of Blackwall Mountain Range
- Clearance/severance of heathland west of Wardell

Visual/Urban Design
Section 2: Option 2F

Advantages/ Strengths/ Opportunities

- Does not impact ecologically sensitive heathland
- One bridge crossing only
- Reasonably varied experience includes:
  - Views to Broadwater and Wardell,
  - Views to Sugar Mill,
  - Views to Wardell Bridge
  - Views to Cooks Hill
  - Views to Laws Hill

Visual/Urban Design
Section 2: Option 2F

Disadvantages/ Weaknesses

- Major embankment heights throughout ranging from 4-8 metres
- Bridge crossing is longest in length – over 1 km and very high clearance requirements mean 6-8 metre approach embankments
- Little relationship to junctions of landscape types – the route cuts through the middle of cane fields particularly east of the Richmond River
- Little visual access to existing vegetation/ woodland – mostly views to cane fields

Visual/Urban Design
Section 2: Option 2F

Disadvantages/ Weaknesses (cont.)

- Route is close to both Wardell and Broadwater
- Increases visual and physical severance of the Richmond River north east of Broadwater
- High visual impact due to high magnitude of proposal
- Visual experience is okay but there are long stretches of cane fields and only distant views of the Blackwall Range

Visual/Urban Design
Section 3: Option 3A

Advantages/ Strengths/ Opportunities

- Follows junction of landscape types – foothills of Blackwall Mountain Range and cane field floodplain
- Captures stands of existing vegetation – edge of Blackwall Mountain Range
- Utilises existing highway as a potential service road
- Potentially rich and varied experience: – skirts edge of the Blackwall Mountain Range, is elevated and looks over the sugarcane valley floodplain
- Low visual impact as landscape less sensitive

Visual/Urban Design
Section 3: Option 3A

Disadvantages/ Weaknesses

- Embankment heights vary up to 6 metres
- Potential impact on rural residences located along the foothills of the Blackwall Mountain Range
- Route traverses existing fringe rural countryside in the foothills of the Blackwall Mountain Range

Visual/Urban Design
Section 3: Option 3B

Advantages/ Strengths/ Opportunities

- Embankment heights generally limited to 2 metres
- Utilises existing road corridor
- Low visual impact as utilises existing corridor and is less sensitive landscape – highly disturbed by agricultural and road activities

Visual/Urban Design
Section 3: Option 3B

Disadvantages/ Weaknesses

- Little relationship to junctions of landscape types – the route cuts through the middle of the cane fields
- Potential impact on rural residences along edge of existing highway particularly as there will be an increase in corridor footprint
- As the existing landscape character is through cane fields, more open views would more appropriate and therefore would mean less opportunity for screen planting of the highway
- Potentially less varied visual experience as the route is in the floodplain and through cane fields

Engineering (Flooding, Geotechnical)

Andrew Nathan

Robert Peterson

Peter Volk

Engineering

Andrew Nathan

Engineering

SECTION 1		
OPTION	**ADVANTAGES**	**DISADVANTAGES**
1A	▪ Lowest earthworks volumes	▪ Highest Acid Sulphate Soil risk (44% more PASS area) ▪ Equal longest length of bridges and viaducts (500m additional) ▪ Longest length over deep soft soils (200m additional) ▪ Highest impact on local traffic (4km of additional local roads to be constructed)
1B	▪ Lowest impact on local traffic	▪ Longest Option (5% longer) ▪ Equal longest length of bridges and viaducts (500m additional)
1C	▪ Lowest Acid Sulphate Soil risk ▪ Shortest option ▪ Shortest length of bridges and viaducts ▪ Shortest length over deep soft soils	▪ Highest earthworks volumes (10% additional volume)

Engineering

SECTION 2		
OPTION	**ADVANTAGES**	**DISADVANTAGES**
2A	▪ Lowest Acid Sulphate Soil risk	▪ Highest earthworks volumes (30% additional volume)
2B	▪ Shortest length over deep soft soils	
2C	▪ Shortest length of bridges and viaducts	▪ Longest Option (12% longer)
2D	▪ Shortest option	
2E(+2D)	▪ Lowest earthworks volumes ▪ Lowest impact on local traffic	
2F		▪ Highest Acid Sulphate Soil risk (200% more PASS area) ▪ Longest length over deep soft soils (7,300m additional) ▪ Longest length of bridges and viaducts (4,300m additional) ▪ Highest impact on local traffic (13km of additional local roads to be constructed)

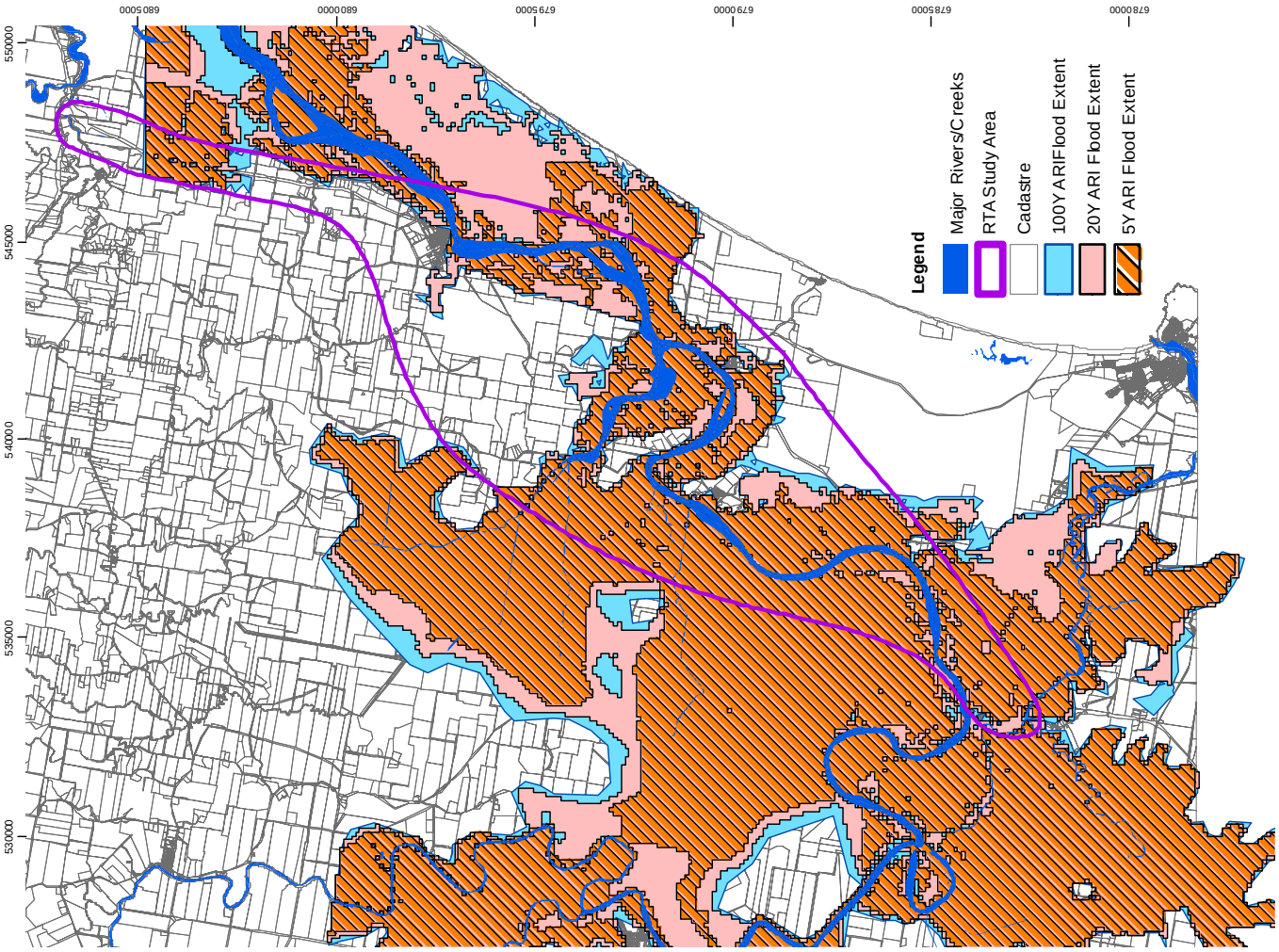
Engineering

SECTION 3		
OPTION	**ADVANTAGES**	**DISADVANTAGES**
3A	▪ Lowest earthworks volumes ▪ Equally Low Acid Sulphate Soil risk ▪ No major bridges/viaducts ▪ Shortest length over deep soft soils	▪ Highest impact on local traffic (8km of additional local roads to be constructed) ▪ Longest Option (6% longer)
3B	▪ Lowest impact on local traffic ▪ Equally Low Acid Sulphate Soil risk ▪ Shortest option ▪ No major bridges/viaducts	▪ Highest earthworks volumes (55% additional volume) ▪ Longest length over deep soft soils (1600m additional)

Flooding

Robert Peterson

Flood Extents



Flood Management Objectives

Afflux:

- Limit the rise in water level upstream of a hydraulic structure (levee, culvert, bridge, etc.)
- Restricted to 50mm max in the 100 year ARI event.

Duration:

- Limit effects on flood inundation times across the flood plain
- Generally managed when limiting effects on flood levels

Direction:

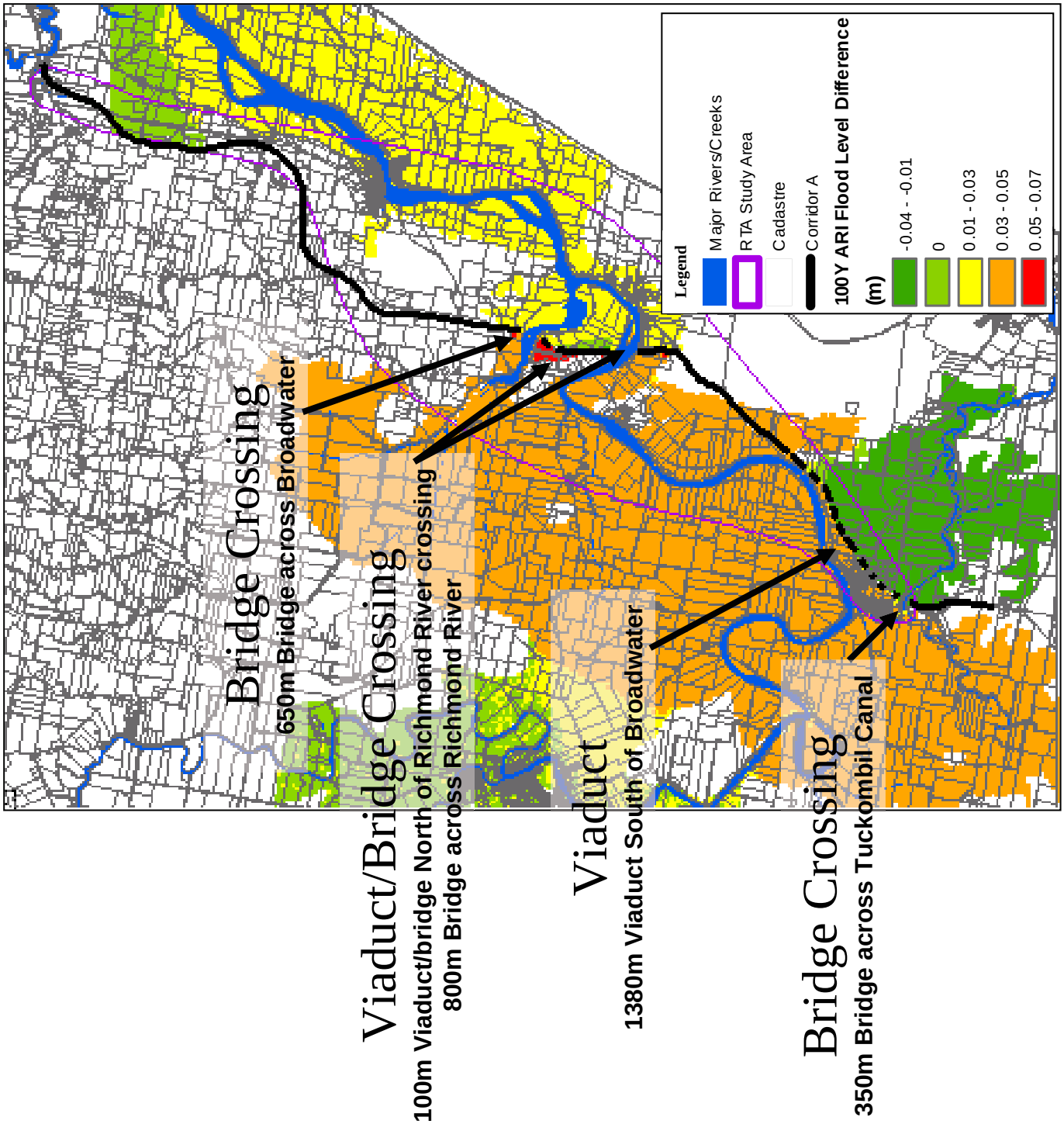
- Limit major changes in direction of flow across the flood plain, particular in areas East of Woodburn/Evans River

Flood Hazard:

- No change in flood hazard classification in developed areas

Corridor A (1A-2B-3A)

1 in 100 year ARI Stormwater Management Works



Advantages & Disadvantages
Section 1

Option	Comments
1A	•Most flood mitigation required •Longest length of bridge / viaduct •Close to the river •High impact on local flows
1B	•Flood mitigation required (less impact than 1A) •Longest length of bridge / viaduct •Close to the river •High impact on local flows
1C	•Least flood Mitigation required •Shortest length of bridge / viaduct •Away from river •Medium impact on local flows

Advantages & Disadvantages
Section 2

Option	Comments
2A	•Flood mitigation required •2 bridges over river •High impact on local flows
2B	•Flood mitigation required •2 bridges over river •Medium impact on local flows
2C	•Least flood Mitigation required •Shortest length of bridge / viaduct •Low impact on local flows
2D	•Flood Mitigation required •Shortest length of bridge / viaduct •Low impact on local flows
2E	•Flood Mitigation required •Shortest length of bridge / viaduct •Low impact on local flows
2F	•Most flood Mitigation required •Longest length of bridge / viaduct •Close to river •Low impact on local flows due to amount of viaduct

Advantages & Disadvantages
Section 3

Option	Comments
3A	•Minimal flood mitigation required •High impact on local flows
3B	•Flood mitigation required •Low impact on local flows

Geotechnical

Peter Volk

Geotechnical Investigations

- Assessment of available data
- Boreholes, testpits and cone penetrometer tests
- Limited laboratory testing of soils

Principal Geotechnical Constraints

- Depth of soft soils / cost implications for foundation treatments
- Depth of rock (implications for piling depths for bridges)
- Material Sources (road cuts and quarries)

Geotechnical – Section 1

Route Option	Advantages	Disadvantages
1A	• Potential for sourcing of materials from cutting in Lang Hill.	• 2km of soft clay (5-15m)
1B	• Potential for sourcing of materials from cutting.	• 1.9km of soft clay (5-15m)
1C	• Potential for sourcing of materials from cutting.	• 1.9m of soft clay (5-15m)

Geotechnical – Section 2

Route Option	Advantages	Disadvantages
2A	• Bridge over Richmond R. near Rileys Hill - shallow piling depths of 0-13m. • Bridge over Tuckean Broadwater with shallow piling depths of 1-8.5m.	• 0.55km of soft clay (5 –15m)
2B	• Road materials sourced from two large cuts between Nodes EJ.	• 0.25km of soft clay (5-15m) • Bridges over Richmond River and Tuckean Broadwater with piling depths of 22-29m.
2C	• One bridge crossing of Richmond River with piling depths of 25-35m. • Road materials sourced from long cut between Nodes GK.	• 0.6km of soft clay (15-25m)
2D	• One bridge crossing of Richmond River with piling depths of 25-35m.	• 0.75km of soft clay (15-25m)
2E	• One bridge crossing of Richmond River with piling depths of 25-35m. • Potential for sourcing materials from road cuts.	• 0.8km of soft clay (15-25m)
2F	• One bridge crossing of Richmond River with piling depths of at least 30m.	• 7.6km of soft clay (15-25m).

Geotechnical – Section 3

Route Option	Advantages	Disadvantages
3A	• Minor cuts may supply some fill materials.	• 3.4km of soft clay (5-10m)
3B	• Deletion of stabilising berm from one side of road, hence less foundation treatment and material	• 5km of soft clay (5-10m) • Total & differential settlement of existing road due to new embankment

Environment (Ecology, Water Quality)

Annette Ross

Environment – Planning and Zoning

- The implications of planned amendments to the *Environmental Planning & Assessment Act 1979* for the Woodburn to Ballina project are currently being reviewed by the RTA.

Environment – Planning and Zoning

Option	Advantages	Disadvantages
Section 1:		
Option 1A	Roads not prohibited.	Could affect Broadwater National Park.
Option 1B	Roads not prohibited.	Could affect Broadwater National Park.
Option 1C	Roads not prohibited.	Could affect Broadwater National Park.
Section 2:		
Option 2A	Roads are not prohibited in most of this option.	•Affects SEPP14 coastal wetland •Zoning prohibits roads in this SEPP14 area.
Option 2B	Roads are not prohibited in this option.	Affects SEPP14 coastal wetland

Environment – Planning and Zoning

Option	Advantages	Disadvantages
Option 2C	Roads are not prohibited in this option.	
Option 2D	Roads are not prohibited in this option.	
Option 2E	Roads are prohibited in parts of this option.	Roads prohibited through the 1e Rural (extractive & mineral resources) zoning.
Option 2F	Roads are not prohibited in this option.	
Section 3:		
Options 3A and 3B	No option has advantages over the other	

Environment - Ecology

A number of the route options could pose the potential for significant species, endangered populations and Endangered Ecological Communities.

Option	Advantages	Disadvantages
Section 1:		
Option 1A	Primarily traverses cleared land. Lower impact on Endangered Ecological Communities (EECs) (25.55ha) in comparison to 1B and 1C.	Could create a barrier to fauna movement and some loss of habitat for threatened flora and fauna species.
Option 1B	Primarily traverses cleared land.	Impacts on 38.54ha of EEC. Could create a barrier to fauna movement and some loss of habitat for threatened flora and fauna species.
Option 1C	Primarily traverses cleared land.	As above but traverses a greater area of EEC than Option 1A and 1B (84.67ha).

Environment - Ecology

Option	Advantages	Disadvantages
Section 2:		
Option 2A		Large EEC impact (128.86ha). Large impact on threatened species.
Option 2B		Large impact on EECs (109.95ha). Large impact on threatened species.
Option 2C	Traverses primarily cleared land north of Broadwater National Park until it crosses Richmond River.	Highest impact on EECs (146.19ha). Large impact on threatened species.
Option 2D	Traverses the edge of Wardell Heath parallel to Back Channel Road.	Impact on EECs (106.36ha). Impact on threatened species. Potential impact on hydrological regime.
Option 2E		Impact on EECs (99.48ha). Impact on threatened species. Potential impact on hydrological regime.
Option 2F	Generally poses the lowest potential for ecological impact in Section 2.	Impacts on EECs (41.61ha)

Environment - Ecology

Option	Advantages	Disadvantages
Section 3:		
Option 3A		Highest EEC impacts in Section 3 (42.83ha)
Option 3B	Generally poses the lowest potential for ecological impact in Section 3.	Impacts on EECs (22.07ha).

Environment - Water Quality

- Historical water quality data shows that the main issues of concern within the study area are a very low pH and dissolved oxygen levels, with turbidity levels also being elevated at a number of sites.
- Water testing commenced in June 2005 in accordance with the Hyder's Water Quality Monitoring Plan.
- Fourteen surface water quality monitoring sites were selected upstream and downstream of the seven locations where the route options cross significant watercourses. A further two sites were sampled upstream of the study area to characterise upstream water quality.
- No advantages or disadvantages between options can be determined from the water quality monitoring at this stage. However it is considered that the number of water crossings would increase the potential to cause water quality impacts.

Heritage (Aboriginal, Non-Aboriginal)

Annette Ross

Heritage - Aboriginal

Option	Advantages	Disadvantages
Section 1:		
Option 1A	All options disturbed by land clearing, grazing and farming	Reported massacre site at Woodburn
Option 1B	As above	Reported massacre site at Woodburn
Option 1C	As above	Reported massacre site at Woodburn
Section 2:		
Option 2A	Extensively disturbed by vegetation clearing, farming and grazing. Archaeological resource is unlikely to be substantial.	3 possible scarred trees affected by Options 2A and 2B on a valley flat.
Option 2B	Extensively disturbed by vegetation clearing, farming and grazing. Archaeological resource is unlikely to be substantial.	As above Potential for subsurface evidence of Aboriginal occupation on the sand rise between Tuckean Broadwater and Old Bagotville Road.

Heritage - Aboriginal

Option	Advantages	Disadvantages
Option 2C	Extensively disturbed by vegetation clearing, farming, quarrying and grazing.	Mythological/sacred site situated on the Richmond River bed. Group of four scarred trees north of Back Channel Road, Bagotville.
Option 2D		Traverses culturally sensitive coastal barrier landscapes. Reported Aboriginal burials in the sand plain near Wardell. Historic/contemporary Aboriginal campsite south of Bingal Creek.
Option 2E		2 culturally significant sites with a high level of Aboriginal heritage sensitivity.
Option 2F	No permanent Aboriginal constraints identified.	

Heritage - Aboriginal

Option	Advantages	Disadvantages
Section 3:		
Option 3A	Not considered to have any substantial archaeological potential.	
Option 3B	Not considered to have any substantial archaeological potential.	

Heritage – Non-Aboriginal

Option	Advantages	Disadvantages
Section 1:		
Option 1A	No items as having either local or State heritage significance.	Archaeological potential - Langs Brick Quarry at Langs Hill. Tuckombil Canal Other items: Drainage canals Early stock route
Option 1B	No items as having either local or State heritage significance.	Archaeological potential - Langs Brick Quarry at Langs Hill Tuckombil Canal Other items: Drainage canals Early stock route
Option 1C	No items as having either local or State heritage significance.	Archaeological potential - Langs Brick Quarry at Langs Hill Tuckombil Canal

Heritage – Non-Aboriginal

Option	Advantages	Disadvantages
Section 2:		
Option 2A	No items listed on either a LEP or State Heritage Register.	Number of items tentatively identified as having local heritage significance.
Option 2B	No items identified as having either local or State heritage significance.	Option passes close to a listed item on the WCBHS, the former Bagotville Post Office.
Option 2C		Possible cemetery site north of the property 'Heathvale'.
		There are a number of heritage sites of local and of Commonwealth significance (Broadwater Catholic Church) near the option. The potential for unknown heritage sites of heritage significance is likely to be high, particularly in the vicinity of the Byrne property.
Option 2D	No items of local or State heritage significance.	Possible cemetery site north of the property 'Heathvale' and the option is close to the Wardell Cemetery. The potential for unknown heritage sites of heritage significance is likely to be high, particularly in the vicinity of the Byrne property. The former Meerschaum Vale brickworks has been included in the WCBHS and has been assessed of being of local significance.

Heritage – Non-Aboriginal

Option	Advantages	Disadvantages
Option 2E	No items of local or State heritage significance.	Possible cemetery site north of the property 'Heathvale'. Modified or artificial drainage channels, mill site, moveable items associated with sand mining operations near Cooks Hill, Wardell Recreation Grounds, Wardell Cemetery, and extant tramways associated with sugar cane haulage.
Option 2F	No items of local or State heritage significance.	Possible cemetery site north of the property 'Heathvale'. Modified or artificial drainage lines, a mill site constructed by the Bagot brothers, moveable items associated with sand mining in the quarry near Cooks Hill, and tramlines associated with sugar cane haulage.
Section 3:		
Option 3A	No items of local or State heritage significance.	
Option 3B	No items of local or State heritage significance.	

Noise, Social and Economic Impacts

Matt Sugden
Carolyn Stone
Mike Butler

Noise Impacts

Matt Sugden

Noise Assessment – General Considerations

Traffic noise impact assessment based upon:

- Noise survey findings
- Predicted traffic volumes for 2015 (designated opening year for study purposes only) and 2035
- Concrete road surface
- 110 kph posted speed limit
- No noise mitigation

Assessments consider all dwellings within 300m of corridor. At greater distances, noise levels are normally within EPA criteria and other noise sources become significant.

Summary of Findings: Short-List Corridors

Excepting option 3B, all options will offer beneficial noise impact for the community in general when considered against the ‘do-nothing’ scenario.

Noise impact due to change in noise level during year of opening is generally worse. Over time, the community would become acclimatised to some extent, with the noise impact reducing.

‘Hotspots’ exist at Broadwater, north-west Wardell and Pimlico, where higher population density exists close to corridor option.

Section	Option	No. dwellings within 300m of corridor
1	1C	5
	1A	57
2	2D	176
	2B	57
3	3A	10
	3B	16

Noise Impact Findings – Section 1

Option	Advantages	Disadvantages
1A	• Northern section follows existing highway – affected dwellings already have traffic noise exposure • Potential for localised noise barrier to partially mitigate noise at Woodburn	• Noise impact on Woodburn sports fields • Route passes close to densely populated area
1B	As above	As above
1C	• Avoids densely populated areas • Northern section follows existing highway – affected dwellings already have traffic noise exposure • Fewer than ten dwellings will require mitigation	-

Noise Impact Findings – Section 2

Option	Advantages	Disadvantages
2A	• Avoids densely populated areas	• Introduces traffic noise to previously unaffected areas, including Rileys Hill
2B	• Avoids densely populated areas	• Introduces traffic noise to previously unaffected areas
2C	• Almost half of assessed noise impact occurs within Broadwater - community already having some traffic noise exposure • Potential for localised noise barrier to partially mitigate noise	• Route passes close to densely populated area • Introduces traffic noise to previously unaffected areas
2D	• Almost half of assessed noise impact occurs within communities already having some traffic noise exposure • Potential for localised noise barrier to partially mitigate noise	• Route passes close to two densely populated areas • More than 150 dwellings potentially requiring mitigation • Noise impact on Wardell sports ground
2E	• Some of assessed noise impact within community already having some traffic noise exposure • Potential for localised noise barrier to partially mitigate noise	• Route passes close to densely populated area • Noise impact on Wardell sports ground
2F	• Most noise impact within community already having traffic noise exposure • Potential for localised noise barriers to partially mitigate noise	• Route passes close to densely populated areas • Noise impact on caravan park

Noise Impact Findings – Section 3

Option	Advantages	Disadvantages
3A	• Avoids densely populated areas	-
3B	• Avoids densely populated areas • Follows route of existing highway – affected community already has traffic noise exposure	-

Social Impacts

Carolyn Stone

Socio-Economic Impacts

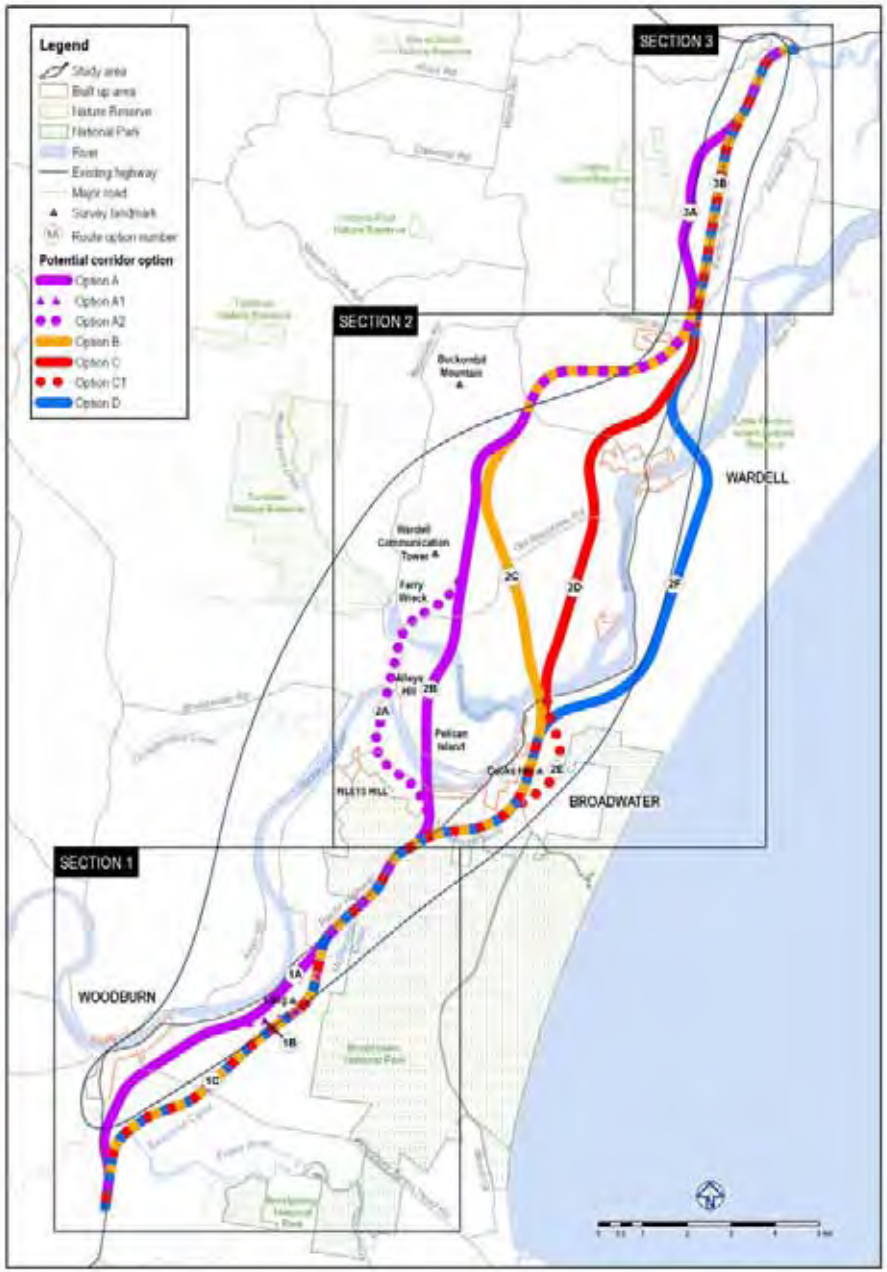
Mike Butler

Socio-Economic Impacts

- Six key impacts - Quantified
  - RUCBA
  - Agriculture
  - Amenity (Urban)
  - Business Impacts
  - Ecology
  - Rec. & Tourism

Socio-Economic Impacts

Assumed Corridors



Road User Cost Benefit Analysis (RUCBA)

- Costs (Construction & Maintenance)
- Benefits
  - –Travel Time
  - – Accident Costs
  - – VOCs
- Key Drivers
  - – Costs – Length & Terrain
  - – Benefits – Distance & Speed

→ **Length and Terrain**

Agriculture

- Focus on productive capacity, transportation, drainage
- Sugar Cane
  - Land most productive
  - Most disruptive
- Grazing / Timber
  - Lower value
- Number of buildings affected
- Rural residential blocks (direct impact)

Agriculture… cont.

Section	Strength	Weakness
1	• Agricultural Value – reduced Sugar Cane 1C	• Agricultural Value – Sugar Cane 1A/1B
2	• Agricultural Value – Grazing & Forests 2C – Edge Cane 2D • Rural Residential – less for 2B/2C	• Agricultural Value – Large Areas of Grazing / Impact upon Sugar Cane (2A, 2B, 2F)
3	• 3A – reduced disruption to sugar cane network < disruption drainage and production	• 3B – Greater impact on Sugar Cane land & Rural Residential • 3A – impacted dwellings

Amenity - Urban

- Relative position of the road alignment to urban centers (townships)
- Greater relative value if further away
- All - improved to existing
- Focus on urban impacts (general)

Amenity (Urban)

- Relative position of the road alignment to urban centers (townships)
- Greater relative value if further away
- All - improved to existing
- Focus on urban impacts (general)

Section	Strength	Weakness
1	• Distance from Woodburn (1C)	
2	• 2B – avoids Broadwater, Woodburn and further from Rileys Hill • 2C – avoids Wardell	
3		• 3B – Closer to rural residential blocks (North Wardell)

Business Impacts

- Measure Short and Long Term Impacts
- Key - Townships to attract visitors
- Destination not Stopover
- Short Term – favor existing businesses (Woodburn)
- Long Term – development of individual character
- Longer term benefits > short term costs

Business Impacts

- Measure Short and Long Term Impacts
- Key - Townships to attract visitors
- Destination not Stopover
- Short Term – favor existing businesses (Woodburn)
- Long Term – development of individual character
- Longer term benefits > short term costs

	Strengths	**Weaknesses**
Short Term	• Central Corridors	• Western Corridors
Long Term	• Western Corridors	• Central / Eastern Corridors

Ecological Impacts

- Measured / Quantified
  - Native Vegetation
  - Wetlands
  - National Parks
- Valued based on area of natural environment impacted
- Willingness to pay for preservation

Broad Comment

Strengths	**Weaknesses**
• Corridor D – reduced areas of impacted environment	• Corridor A2 - SEPP 14 • Corridor C & C1 - Veg Class 4 • Corridor A/A1/A2 - Veg Class 3

Recreation & Tourism

- Affects driven by local attractions
- Focus on river and river related activities (local council initiative)
- Favors routes away from river/townships

Section	Strengths	Weaknesses
1	• Further from townships (1C)	
2	• Avoids Wardell (2A, 2B, 2C)	• Wardell – high bridge/fishing (2F) • Pimlico Road – Cycling (2F)
3	na	na

Socio-Economic Impacts

- Benefit Cost Ratio / NPV
  - Relative standing
  - Quantifiable
  - Value for Money

Socio-Economic Impacts

- Benefit Cost Ratio / NPV
  - Relative standing
  - Quantifiable
  - Value for Money

Strengths	Weaknesses
• Central Corridors	• Eastern Corridor • Western Corridor

Socio-Economic Impacts

- BCR/NPV
- Quantified Costs & Benefits
- Trade-off between quantifiable and non quantifiable

Appendix 6. Presentation on Feedback from the Corridor Options Display

Feedback from the display period

Annette Ross

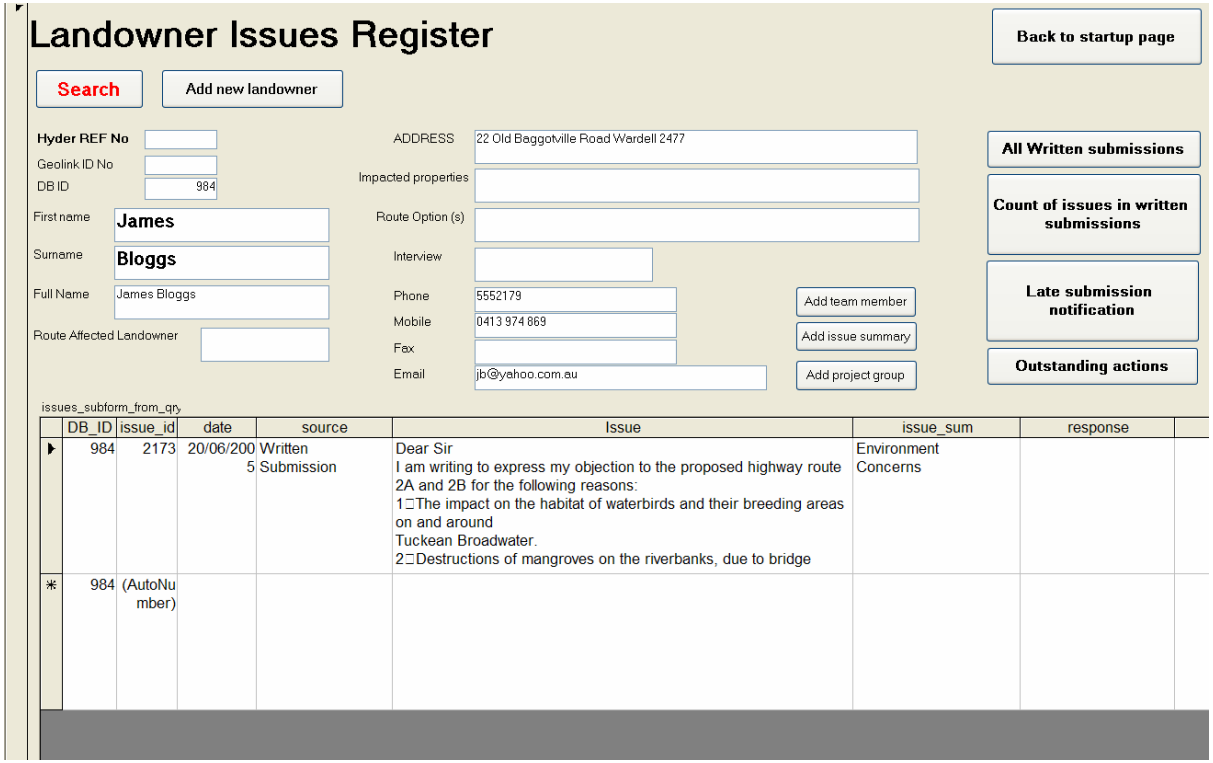
Feedback from the display period

- Written Submissions and Feedback Forms
- 189 written submissions have been received from 154 individuals and organisations.
- 380 Feedback Forms were received.
- Written submissions do not include the Feedback Forms.
- Authors of submissions generally live or own property within or adjacent to the study area.

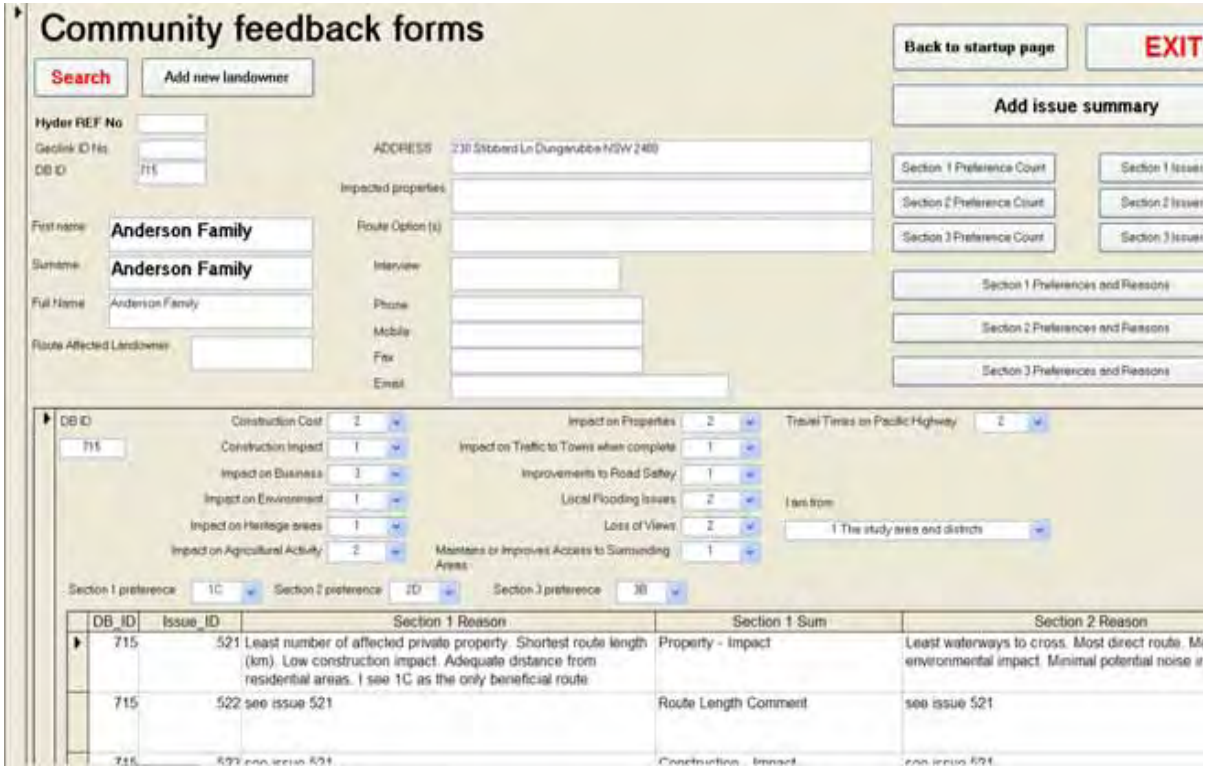
Data Management

- Each Submission and Feedback Form received a unique identification number.
- All Submissions and Feedback Forms were scanned and entered into a database.
- The database has the capacity to generate a number of reports to interrogate the data.
- Issues raised in Submissions were identified in categories.
- Responses are being prepared to the issues and entered into the database.
- A Submissions Report is currently being prepared. (See the Macksville to Urunga Submissions Report on the RTA's website.)

Landowners Issues



Community Feedback



A count of issues raised

- Environment
- Property
- Traffic Noise
- Flooding and drainage
- Lifestyle of local residents
- Agricultural land
- Air quality
- Business

Snapshot of Issues Raised

- Route Options Development Process
- How were options chosen?
- Dissatisfaction/disappointment with routes selection.
- Role of the CLG in formulating options.
- Options are different to ones nominated by CLG members.

Issues: Concept Design

- Height of the new highway will dam water, making part of the farm unusable for farming
- Number of river crossings
- Length of bridges
- Bridge foundations in soft soils
- Disturbance of soft soils and acid sulfate soils during construction
- Location of access roads and additional impacts on residences and residential areas
- Heavy fogs occur from early evening to mid-morning creating a traffic hazard.
- Amount of fill required to build a flood-free highway.
- Alternative routes suggested

Issues: Environmental

- Tuckean Swamp is a major contributor to the acidification of the Richmond River
- Remnant Melaleuca and Casuarina habitat on the northern side of Tuckean Broadwater is of high conservation value and of regional significance
- Acoustic impacts along the Blackwall Range from an ‘amphitheatre’ effect which will amplify traffic noise
- Encroachment of a new road into Broadwater National Park
- Impact on wildlife corridors
- Impact on fisheries
- Number of endangered and vulnerable species of flora and fauna, especially koalas
- Cumulative effects of particulates in the air from increased traffic together with emissions from the sugar mill
- Insufficient ecological studies for Option 3A
- Area supports the highest density of threatened species habitats and Endangered Ecological Communities and nationally significant native vegetation.

Issues: Planning & Zoning

- Town expansion opportunities in Wardell
- New highway will encourage rapid urbanization, land sub-division and loss of rural properties
- Ballina Council’s rezoning proposal near Blackwall Range

Issues: Property

- Impact on farming operations and the movement of stock and machinery
- Access to separated sections of a farm
- Impact on traditionally owned land
- Acquisition and compensation
- RTA’s policies and procedures relating to property acquisition and compulsory acquisition

Issues: Hydrology/ Hydraulics

- Extent of flooding and flood levels experienced over various flood events
- Prolonged property inundation during floods with a new highway
- Route option will affect known flooding regimes

Issues: Socio-economic

- Impact on small farms will render them unsustainable and economically unviable
- Opportunities to expand residential component of the Sandalwood Caravan and Leisure Park would be inhibited and lack of growth would have an adverse effect on existing service providers in Wardell
- Access to existing bus services
- Social disruption of a new road in a previously quiet rural residential area
- Cost of the highway vis a vis bus and train
- There are more issues going through farmland and close proximity to local towns than going through Broadwater National Park.
- Maintaining country lifestyles
- Area of cane land affected
- Cane harvesting and transport
- Expansion of production at Broadwater mill and new business opportunities
- Effect on quality of life through increased noise and traffic
- Displacement of families

Issues: Heritage

- Heritage sites of interest to Aborigines not identified
- River crossings could affect sacred sites and the spirits and souls of people

Issues: Consultation Process

- Details on the brochure did not include cadastral or topographic information
- Rushed decision is politically motivated
- Landowners were never consulted when the route options became a big issue
- Information on the internet was not up-to-date and scant
- Not enough time to consider the options

Options – opinions and preferences

- Submissions that mentioned preferences or opposition to options mainly addressed options in Section 2.
- Improve rail infrastructure to reduce energy depletion
- Provide fast, long distance freight transport instead of a new road

Feedback Forms

- 380 Feedback Forms have been received. Respondents were requested to provide feedback on the importance of identified issues in Section 1, Section 2 and Section 3. Many respondents did not indicate a preference or provide feedback on the importance of the issues.
- Respondents indicated preferences as follows:
- Section 1 – 1C, 1A and 1B (223 respondents did not identify a preference) on the basis of low level of impact on high value habitat areas, meets construction criteria, least impact on residential areas and high value agricultural land.
- Section 2 – 2F, 2E and 2B, 2D, 2A, 2C for environmental reasons – habitat value, traffic noise, no resumption of private residences.
- Section 3 – 3B (preferred by 226 respondents) makes use of existing highway corridor, no encroachment into rural areas, less wildlife affected.

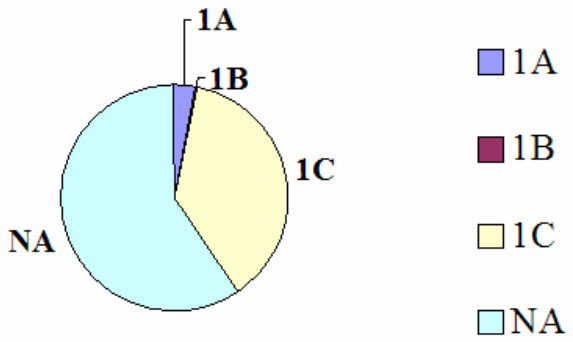
FEEDBACK FORM REPORT

Section 1

Option Preferences as of 20 July 2005

Route Option	Number in favour
1A	11
1B	2
1C	139
NA	224

Section 1 Community Preferences



NA=No Answer

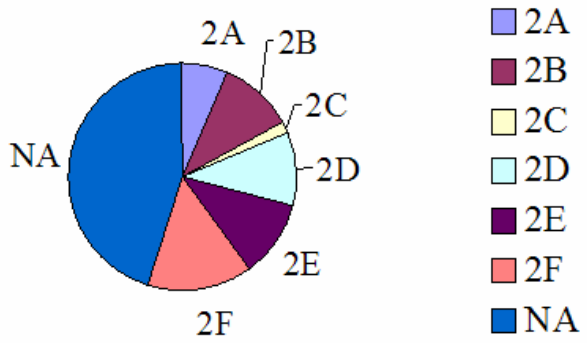
FEEDBACK FORM REPORT

Section 2

Option Preferences as of 20 July 2005

Route Option	Number in favour
2A	25
2B	40
2C	6
2D	39
2E	40
2F	56
NA	170

Section 2 Community Preferences



NA=No Answer

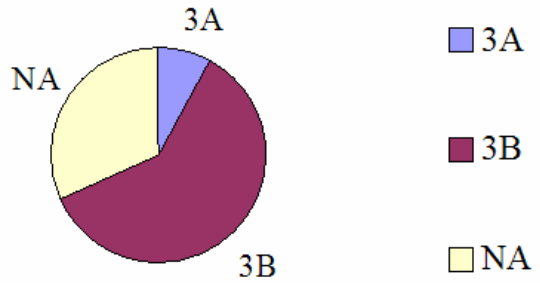
FEEDBACK FORM REPORT

Section 3

Option Preferences as of 20 July 2005

Route Option	Number in favour
3A	30
3B	226
NA	120

Section 3 Community Preferences



NA=No Answer